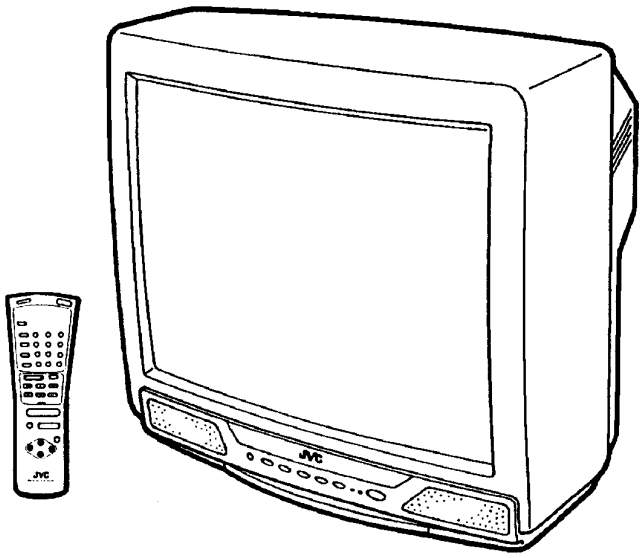
JVC

SERVICE MANUAL

COLOR TELEVISION

AV-20820(US&CA)

BASIC CHASSIS
FA



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No.51196
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SPECIFICATIONS

Item	Content
Dimensions (W×H×D)	19-7/8"×17-7/8"×19" / 50.2cm×45.2cm×48.2cm
Mass	42 lbs / 19.1kg
TV System and Color system	
TV RF System	CCIR (M)
Color System	NTSC
Sound System	BTSC (Multi Channel Sound)
TV Receiving Channels and Frequency	
VL Band	(02 ~ 06) 54MHz ~ 88MHz
VH Band	(07 ~ 13) 174MHz ~ 216MHz
UHF Band	(14 ~ 69) 470MHz ~ 806MHz
CATV Receiving Channels and Frequency	
(Quartz Synthesizer system)	
Low Band	(02 ~ 06, A-8) by (02 ~ 06&01)
High Band	(07 ~ 13) by (07 ~ 13)
Mid Band	(A ~ 1) by (14 ~ 22)
Super Band	(J ~ W) by (23 ~ 36) (54MHz~804MHz)
Hyper Band	(W+1 ~ W+28) by (37 ~ 64)
ULTRA Band	(W+29 ~ W+84) by (65 ~ 125)
Sub Mid Band	(A8, A4 ~ A1) by (01, 96 ~ 99)
TV/CATV Total Channel	180 Channels
Intermediate Frequency	
Video IF Carrier	45.75MHz
Sound IF Carrier	41.25MHz (4.5MHz)
Color Sub Carrier	3.58MHz
Antenna Input Impedance	75Ω (VHF/UHF) Terminal, F-Type Connector
Power Input	120V AC, 60Hz
Power Consumption	75W(US)
Input Current	1.3A(CA)
Picture Tube	20"(51cm) Measured diagonally full square
Viewable Picture Size (W×H)	16"×12" / 40.7cm×30.5cm
High Voltage	26.5kV ±1kV (at zero beam current)
Speaker	2"×3-1/2"(5×9cm) oval type×2
Audio Power Output	1W×2
Video Input	1Vp-p, 75Ω
Audio Input	500mVrms(-4dBs), high impedance
Variable Audio output	More then 0 to 1550mVrms (+6dBs), Low impedance (400Hz when modulated 100%)
Remote Control Unit	RM-C746-1C (AA/R6/UM-3 dry battery ×2)

Design & specification subject to change without notice.

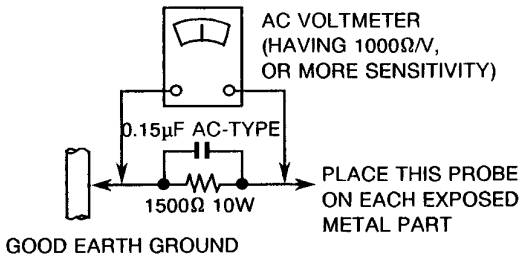
SAFETY PRECAUTIONS

1. The design of this product contains special hardware, many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the products should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. **Electrical components having such features are identified by shading on the schematics and by (⚠) on the parts list in Service manual.** The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list of Service manual may cause shock, fire, or other hazards.
4. **Use isolation transformer when hot chassis.**
   The chassis and any sub-chassis contained in some products are connected to one side of the AC power line. An isolation transformer of adequate capacity should be inserted between the product and the AC power supply point while performing any service on some products when the HOT chassis is exposed.
5. **Don't short between the LIVE side ground and ISOLATED(NEUTRAL) side ground or EARTH side ground when repairing.**
   Some model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE : (⊥) side GND, the ISOLATED(NEUTRAL) : (⏚) side GND and EARTH : (⏚) side GND. Don't short between the LIVE side GND and ISOLATED(NEUTRAL) side GND or EARTH side GND and never measure with a measuring apparatus (oscilloscope etc.) the LIVE side GND and ISOLATED(NEUTRAL) side GND or EARTH side GND at the same time.
   If above note will not be kept, a fuse or any parts will be broken.
6. If any repair has been made to the chassis, it is recommended that the B_1 setting should be checked or adjusted (See ADJUSTMENT OF B_1 POWER SUPPLY).
7. The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives approved by the manufacturer of the complete product.
8. Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10kΩ 2W resistor to the anode button.
9. When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the manufacturer's replacement components.
10. **Isolation Check**
    (Safety for Electrical Shock Hazard)
    After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, video/audio input and output terminals, Control knobs, metal cabinet, screwheads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

(1) **Dielectric Strength Test**
The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 1100V AC (r.m.s.) for a period of one second.
(. . . . Withstand a voltage of 1100V AC (r.m.s.) to an appliance rated up to 120V, and 3000V AC (r.m.s.) to an appliance rated 200V or more, for a period of one second.)
This method of test requires a test equipment not generally found in the service trade.

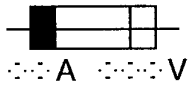
(2) **Leakage Current Check**
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.).

• Alternate Check Method
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Use an AC voltmeter having 1000 ohms per volt or more sensitivity in the following manner. Connect a 1500Ω 10W resistor paralleled by a 0.15μF AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.). Measure the AC voltage across the resistor with the AC voltmeter. Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.35V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).



11. **High voltage hold down circuit check.**
    After repair of the high voltage hold down circuit, this circuit shall be checked to operate correctly.
    See item "**How to check the high voltage hold down circuit**".

This mark shows a fast operating fuse, the letters indicated below show the rating.



FEATURES

- New chassis design enables use of a single board with simplified circuitry.
- Provided with miniature tuner (TV/CATV).
- PLL synthesizer system TV/CATV totaling 180 channels.
- Multifunctional remote control permits picture adjustment.
- Adoption of the CHANNEL GUARD function prevents the specific channels from being selected, unless the "ID number" is key in.
- Adoption of the VIDEO STATUS function.
- Adoption of the ON/OFF TIMER function.
- With 75Ω V/U in common (F-Type) ANT Terminal.
- SLEEP TIMER for setting in real time.
- Closed-caption broadcasts can be viewed.
- Audio Video input terminal.
- Variable Audio output terminal.

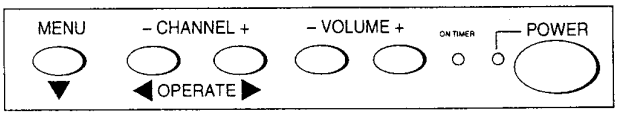
DIFFERENCE LIST OF MAIN PARTS

⚠	Part name	AV-20820(US)	AV-20820(CA)
⚠	RATING LABEL	CM22998-001-A	CM22999-001-A
⚠	INST BOOK (FRENCH)	×	CQ40357-001-A
	REGI.CARD	BT-51006-1Q	×
	SVC CENTER LIST	×	BT-20071B-Q
	WARRANTY CARD	×	BT-52002-1Q

OPERATING INSTRUCTIONS

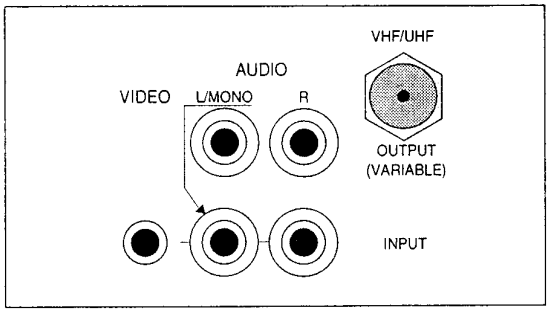
■ The operating instructions are the same as for C-13810(US&CA),C-13811(US&CA) (No.51190). Therefore, please refer to the C-13810(US&CA),C-13811(US&CA) (No.51190) SERVICE MANUAL for detailed instructions.

FRONT PANEL DIAGRAM

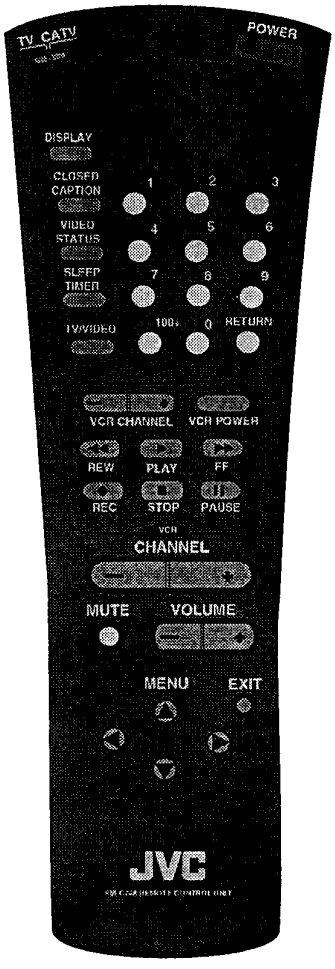


20 Inch Front Panel

REAR PANEL DIAGRAM



REMOTE CONTROL



RM-C746

SPECIFIC SERVICE INSTRUCTIONS

DISASSEMBLY PROCEDURE

REMOVING THE REAR COVER

1. Unplug the power supply cord.
2. Remove the five screws marked Ⓐ and screw marked Ⓑ as shown in Fig.1.
3. Withdraw the REAR COVER toward you.

[CAUTION]

- When reinstalling the rear cover, carefully push it inward after inserting the main board into the rear cover groove.

REMOVING THE MAIN PW BOARD

- After removing the rear cover.

1. Pick this side of the MAIN PWB and raise one slightly, take off the PWB stopper marked Ⓒ from the cabinet bottom.
2. Pull out the MAIN PWB as it is.
   (If necessary, take off the wire clamp and connectors, etc.)

[CAUTION]

- If reinstall the MAIN PWB, first insert the left edge of the MAIN PWB to the groove marked Ⓓ as shown in Fig.1, and push it forward.

CHECKING THE MAIN PW BOARD

1. To check the back side of the MAIN PW Board.
   1) Pull out the MAIN PWB (Refer to REMOVING THE MAIN PWB).
   2) Erect the chassis vertically so that you can easily check the back side of the MAIN PW Board.

[CAUTION]

- When erecting the MAIN PWB, be careful so that there will be no contacting with other PW Board.
- Before turning on power, make sure that the wire connector, CRT earth wire and other connectors properly connected.

WIRE CLAMPING AND CABLE TYING

1. Be sure to clamp the wire.
2. Never remove the cable tie used for tying the wires together. Should it be inadvertently removed, be sure to tie the wires with a new cable tie.

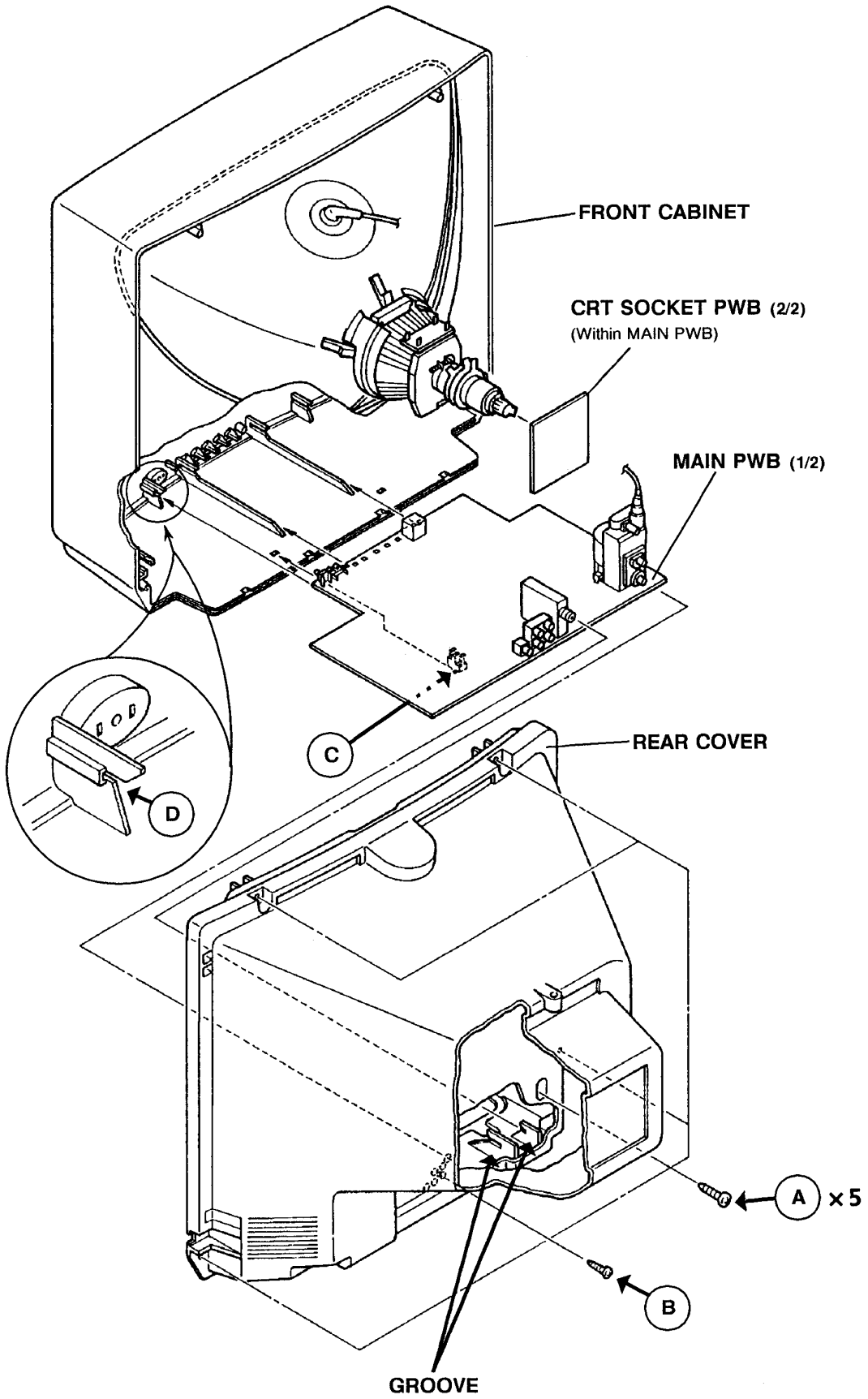

FRONT CABINET
CRT SOCKET PWB (2/2)
(Within MAIN PWB)
MAIN PWB (1/2)
C
D
REAR COVER
A
×5
B
GROOVE

Fig. 1

MEMORY IC REPLACEMENT

1. Memory IC

This model use a memory (EEP-ROM) IC.

The memory IC stores data for proper operation of the video and deflection circuits.

When replacing, be sure to use an IC containing this (initial value) data.

2. Memory IC replacement procedure

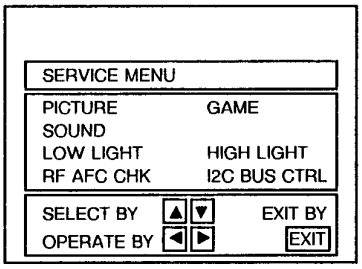
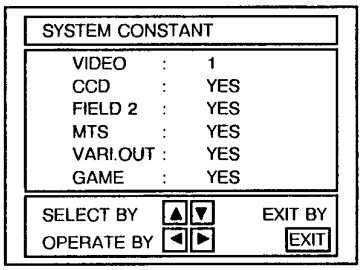
Procedure	Screen display
(1) **Power off** Switch off the power and disconnect the power cord from the outlet.	
(2) **Replace the memory IC.** Initial value must be entered into the new IC.	
(3) **Power on** Connect the power cord to the outlet and switch on the power.	
(4) **System constant check and setting** 1) Simultaneously press the DISPLAY key and VIDEO STATUS key of the remote control unit. 2) The SERVICE MENU screen of Fig. 1 is displayed. 3) While the SERVICE MENU is displayed, again simultaneously press the DISPLAY and VIDEO STATUS keys to display the Fig. 2 SYSTEM CONSTANT screen. 4) Refer to the SYSTEM CONSTANT table and check the setting items. Where these differ, select the setting item with the MENU UP / DOWN key and adjust the setting with the MENU LEFT / RIGHT keys.(The letters of the selected item are displayed in yellow.) 5) After adjusting, release the MENU LEFT / RIGHT key to store the setting value. 6) Press the EXIT key twice to return the normal screen.	 Fig. 1
(5) **Receive channel setting** Refer to the OPERATING INSTRUCTIONS(USER'S GUIDE) and set the receive channels (Channels Preset) as described.	 Fig. 2
(6) **User settings** Check the user setting items According to Table 2. Where these do not agree, refer to the OPERATING INSTRUCTIONS(USER'S GUIDE) and set the items as described.	
(7) **SERVICE MENU setting** Verify what to set in the SERVICE MENU, and set whatever is necessary. (Fig. 1) refer to the SERVICE ADJUSTMENT for setting.	

TABLE 1 (System Constant setting)

Setting item	Setting content	Setting value
VIDEO	0 → 1 → 2	1
CCD	YES → NO	YES
FIELD 2	YES → NO	YES
MTS	YES → NO	YES
VARI.OUT	YES → NO	YES
GAME	YES → NO	YES

Fig. 1

TABLE 2 (User setting values)

Setting item	Setting value
1. Use remote controller keys	
POWER	OFF
CHANNEL	CH 02
CHANNEL PRESET	Set the receive channels.
VOLUME	10
TV/VIDEO	TV
DISPLAY	OFF
SLEEP TIMER	0
VIDEO STATUS	STANDARD
CLOSED CAPTION	OFF
2. Setting from MENU	
TINT	CENTER
COLOR	CENTER
PICTURE	CENTER
BRIGHT	CENTER
DETAIL	CENTER
NOISE MUTE	ON
SET VIDEO STATUS	ALL CENTER
BASS	CENTER
TREBLE	CENTER
BALANCE	CENTER
MTS	STEREO
TV SPEAKER	ON
SET CLOCK	Unnecessary to set
ON/OFF TIMER	NO
CHANNEL SUMMARY	SET OPTIONALLY
SET LOCK CODE	Unnecessary to set
TUNER MODE	AIR
BACKGROUND	BLACK
CLOSED CAPTION	CAPTION : CC1 TEXT : T1
LANGUAGE	ENG

Fig. 2

SERVICE ADJUSTMENTS

ADJUSTMENT PREPARATION:

1. **You can make the necessary adjustments for this unit with either the Remote Control Unit or with the adjustment tools and parts as before.**
2. **Adjustment with the Remote Control Unit is made on the basis of the initial setting values; however, the new setting values which set the screen to its optimum condition may differ from the initial settings.**
3. Turn on the power for the set and test equipment before use, and start the adjustment procedures after waiting at least 30 minutes.
4. Make sure that AC power is turned on correctly.
5. Unless otherwise specified, prepare the most suitable reception or input signal for adjustment.
6. Never touch any adjustment parts which are not specified in the list for this adjustment - variable resistors, transformers, condensers, etc.
7. Presetting before adjustment.
   Unless otherwise specified in the adjustment instructions, preset the following functions with the Remote Control Unit:

• VIDEO STATUS	STANDARD	• BASS, TREBLE, BALANCE	CENTER

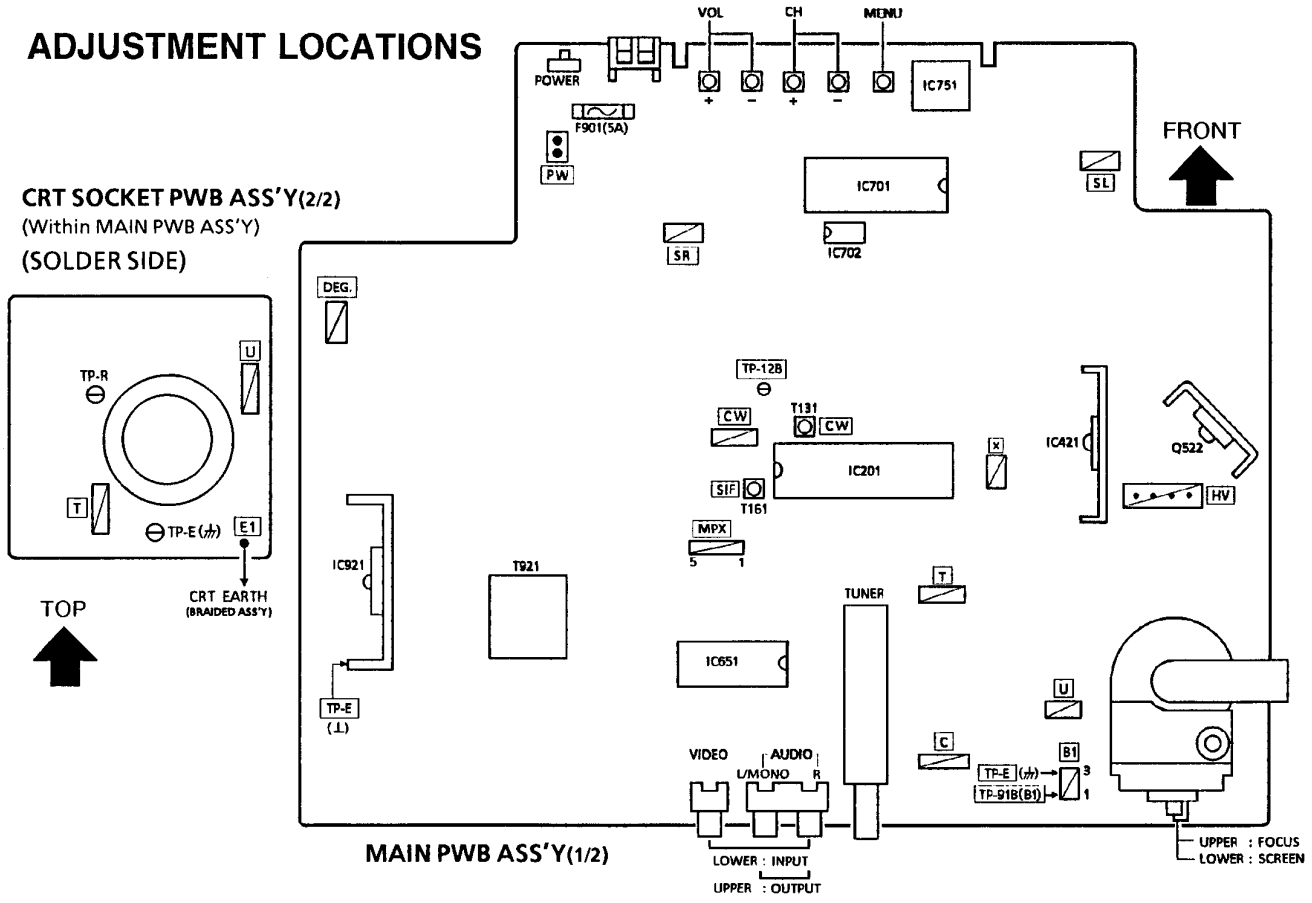
TESTERS & TOOLS

1. DC voltmeter (or digital voltmeter)
2. Oscilloscope
3. Signal generator (Pattern generator) [NTSC]
4. Remote control unit
5. TV audio multiplex signal generator
6. Frequency counter

ADJUSTMENT ITEMS

Adjustment items	Adjustment items	Adjustment items
B1 voltage check	WHITE BALANCE (Low Light)	MTS INPUT LEVEL check
IF VCO	WHITE BALANCE (High Light)	MTS STEREO VCO
RF. AGC	SUB BRIGHT	MTS SAP VCO
FOCUS	SUB CONTRAST	MTS FILTER check
V. CENTER, V. SIZE	SUB COLOR	MTS SEPARATION
H. POSITION	SUB TINT	

ADJUSTMENT LOCATIONS



BASIC OPERATION OF SERVICE MENU

1. TOOL OF SERVICE MENU OPERATION

Operate the SERVICE MENU with the REMOTE CONTROL UNIT.

2. SERVICE MENU ITEMS

In general, the basic setting (adjustments) items or verifications are performed in the SERVICE MENU.

- PICTURE ..... This sets the setting values (adjustment values) of the VIDEO/CHROMA and DEFLECTION circuits.
- GAME ..... This is used when the GAME MODE is adjusted.
- SOUND ..... This sets the setting values (adjustment values) of the AUDIO circuit.
- LOW LIGHT ... This sets the setting values (adjustment values) of the WHITE BALANCE circuit.
- HIGH LIGHT ... This sets the setting values (adjustment values) of the WHITE BALANCE circuit.
- RF AFC CHK .. This is used when the IF VCO is adjusted.
- I2C BUS CTRL . This is used when ON/OFF of the I2C BUS CTRL is set. **[Fixed ON]**

3. BASIC OPERATIONS OF THE SERVICE MENU

(1) How to enter the SERVICE MENU.

1) Press the DISPLAY KEY and VIDEO STATUS KEY of the REMOTE CONTROL UNIT at the same time to display the SERVICE MENU screen shown in Fig.1.

(2) SERVICE MENU screen selection

1) Press the UP / DOWN key of the MENU to select any of the following items.(The letters of the selected items are displayed in yellow.)
   - PICTURE
   - GAME
   - SOUND
   - LOW LIGHT
   - HIGH LIGHT
   - RF AFC CHK
   - I2C BUS CTRL
2) Select either PICTURE or SOUND. The screen shown in Fig.2 will be displayed if the LEFT / RIGHT KEY is pressed.
3) If the UP / DOWN KFY is pressed, the PICTURE MODE screen shown in Fig.3 or the SOUND MODE screen shown in Fig.4 is displayed and the PICTURE or SOUND setting can be performed.
4) If any of the GAME / LOW LIGHT / HIGH LIGHT / RF AFC CHK / I2C BUS CTRL items are selected and the LEFT / RIGHT KEY is pressed, the screens shown in Fig. 5, 6, 7, 8 and 9 are displayed respectively and the settings or verifications can be performed.

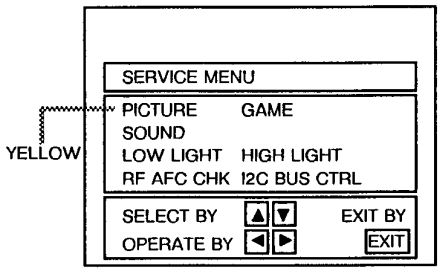


Fig. 1

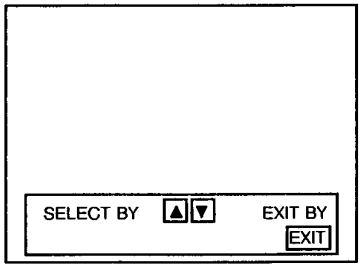


Fig. 2

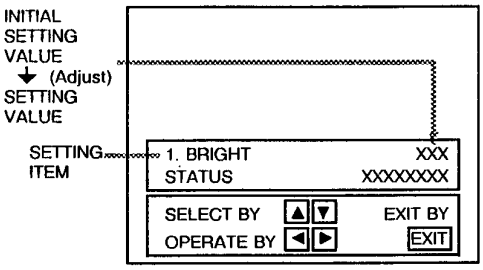


Fig. 3 PICTURE MODE

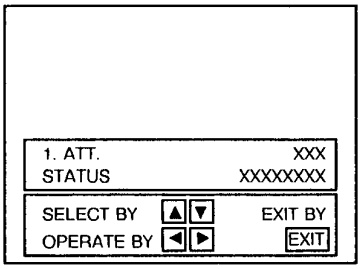


Fig. 4 SOUND MODE

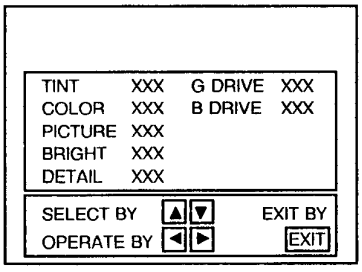


Fig. 5 GAME MODE

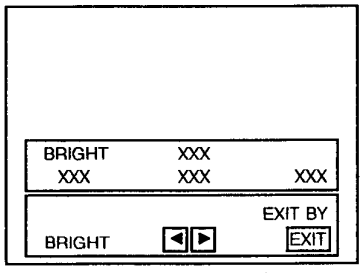


Fig. 6 LOW LIGHT MODE

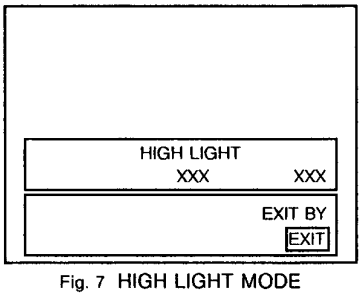


Fig. 7 HIGH LIGHT MODE

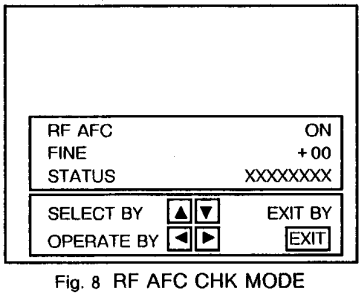


Fig. 8 RF AFC CHK MODE

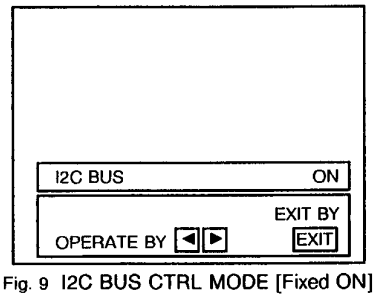


Fig. 9 I2C BUS CTRL MODE [Fixed ON]

(3) Setting method

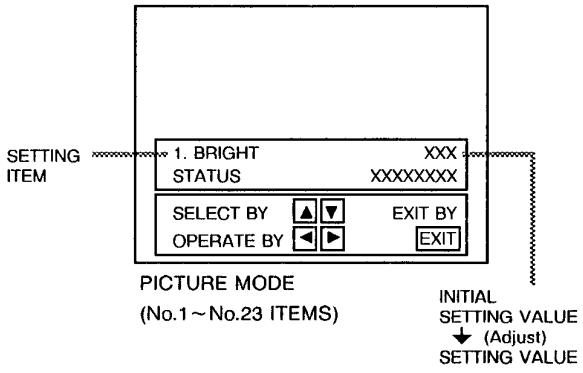
1) UP/DOWN key of the MENU
   Selects the SETTING ITEM
2) LEFT/RIGHT key of the MENU
   Setting (adjust) the SETTING VALUE of the SETTING ITEM.
   When the key is released the SETTING VALUE will be stored (memorized).
3) EXIT key : Returns to the previous screen.

(4) Releasing SERVICE MENU

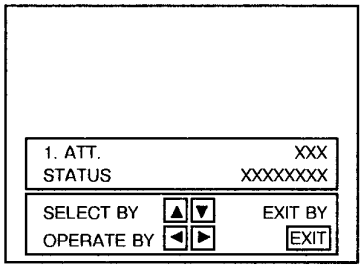
1) After returning to the SERVICE MENU upon completion of the setting (adjustment) work, press the EXIT key again.

★ The settings for LOW LIGHT and HIGH LIGHT are described in the WHITE BALANCE page of ADJUSTMENT.

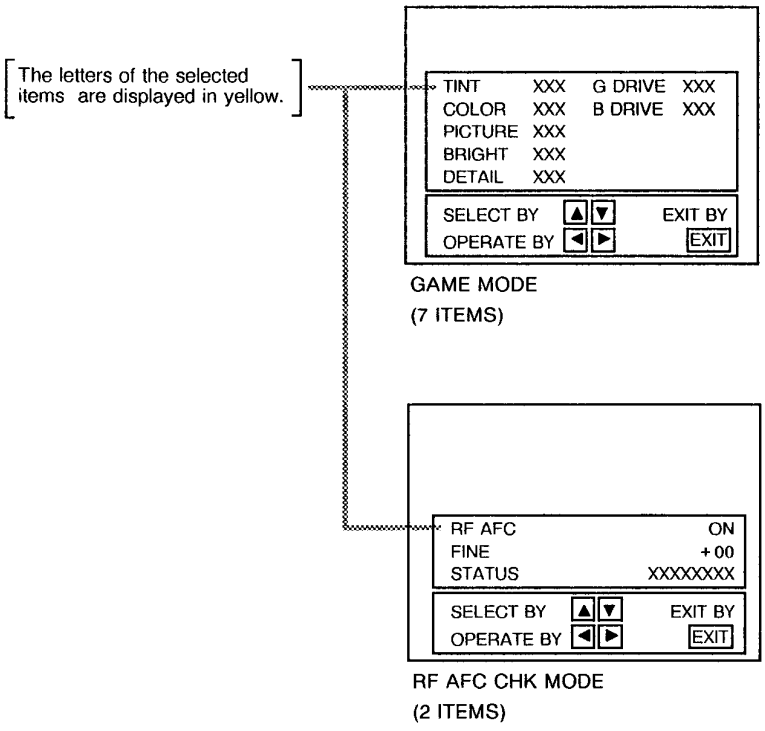
★ The setting for RF AFC CHK are described in the IF VCO page of ADJUSTMENT.



PICTURE MODE
(No.1~No.23 ITEMS)



SOUND MODE
(No.1~No.14 ITEMS)



GAME MODE
(7 ITEMS)

RF AFC CHK MODE
(2 ITEMS)

INITIAL SETTING VALUE OF SERVICE MENU

1. **Adjustment of the SERVICE MENU is made on the basis of the initial setting values; however, the new setting values which set the screen in its optimum condition may differ from the initial setting.**

2. **Do not change the Initial Setting Values of the Setting (Adjustment) items not listed in "ADJUSTMENT".**

- PICTURE MODE

1. The four setting items in the video mode - No.8 EXT BRI., No.9 EXT PIC., No.12 EXT TINT and No.13 EXIT COL. are linked to the items in the TV Mode - No.1 BRIGHT, No.2 PICTURE, No.6 TINT and No.7 COLOR, respectively. When the setting items in the TV mode are adjusted, the values in the setting items in the video mode are revised automatically to the same values in the TV mode. (The initial setting values given in ( ) are off-set values.)
2. When the four items (No.8, 9, 12 and 13) are adjusted in the vide mode, the setting values in each item are revised independently.

No.	Setting (Adjustment) item	Variable range	initial setting value
1.	BRIGHT	0 ~ 127	64
2.	PICTURE	0 ~ 127	90
3.	WPS(WHITE PEAK SUPPRESSOR)	0 ~ 1	1
4.	TV DTL(TV DETAIL)	0 ~ 63	21
5.	TV BPF(TV B.P.FILTER)	0 ~ 1	0
6.	TINT	0 ~ 127	66
7.	COLOR	0 ~ 127	68
8.	EXT BRI.	±25	(0)
9.	EXT PIC.	±25	(0)
10.	EXT DTL(EXT DETAIL)	0 ~ 63	25
11.	EXT BPF(EXT B.P.FILTER)	0 ~ 1	0
12.	EXT TINT	±25	(0)
13.	EXT COL.	±25	(0)
14.	V SIZE	0 ~ 63	35
15.	V CENT.(V.CENTER)	0 ~ 7	4
16.	H POS.(H.POSITION)	0 ~31	20
17.	OSD POS.(O.S.DISPLAY POSITION)	0 ~ 31	9
18.	H AFC	0 ~ 1	0
19.	BLANKING	0 ~ 1	0
20.	VIDEO SW	0 ~ 1	0
21.	Y TRAP	0 ~ 1	0
22.	RF AGC	0 ~ 63	40
23.	PIF VCO	0 ~ 127	64

- GAME MODE

Setting (Adjustment) item	Variable range	initial setting value
TINT	±20	0
COLOR	±20	0
PICTURE	±20	-10
BRIGHT	±20	-5
DETAIL	±15	+5
G DRIVE	-80~ +50	0
B DRIVE	-80~ +50	0

- SOUND MODE

No.	Setting (Adjustment) item	Variable range	initial setting value
1.	ATT.	0 ~ 63	50
2.	BALANCE	0 ~ 63	32
3.	NOISE	0~1	1
4.	IN LEVEL(INPUT LEVEL)	0~63	37
5.	FH MON.(FH MONITOR)	0~1	0
6.	ST VCO(STEREO VCO)	0~63	20
7.	PILOT(PILOT CANCELER)	0~1	0
8.	FILTER	0~63	30
9.	LOW SEP.(LOW SEPARATION)	0~63	30
10.	HI SEP.(HI SEPARATION)	0~63	20
11.	5FH MON.(5FH MONITOR)	0~1	0
12.	SAP VCO	0~63	25
13.	IN GAIN(INPUT GAIN)	0~1	0
14.	FIL. OFF.	0~10	0

- LOW LIGHT MODE

Setting (Adjustment) item	Variable range	initial setting value
R CUTOFF	0 ~ 255	20
G CUTOFF	0 ~ 255	20
B CUTOFF	0 ~ 255	20

- HIGH LIGHT MODE

Setting (Adjustment) item	Variable range	initial setting value
G DRIVE	0 ~ 255	128
B DRIVE	0 ~ 255	128

- RF AFC CHK MODE

Setting (Adjustment) item	Variable range	initial setting value
RF AFC	ON / OFF	ON
FINE	-77~ +77	+00

- I2C BUS CTRL MODE

Setting (Adjustment) item	Variable range	initial setting value
I2C BUS	ON / OFF	Fixed ON

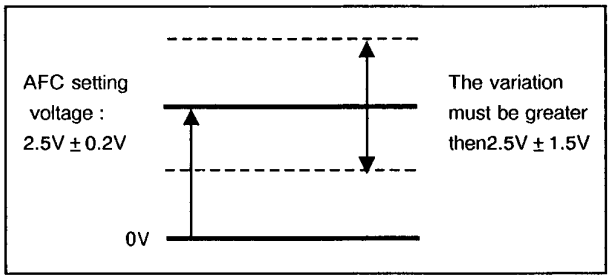
■ ADJUSTMENTS

B1 VOLTAGE CHECK

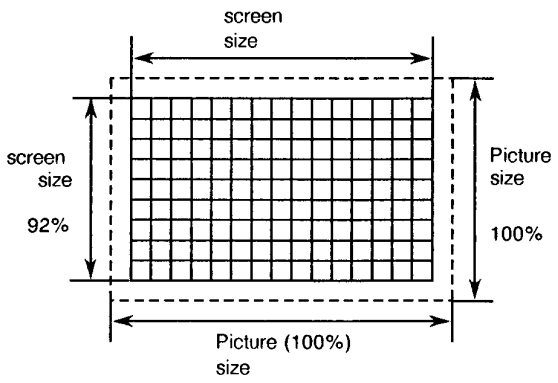
Item	Measuring instrument	Test point	Adjustment part	Description
B1 voltage check	DC Voltmeter	TP-91B (B1 Connector 1 pin) TP-E(⏚)		1. Receive a monoscope pattern signal. 2. Connect the DC voltmeter to TP-91B(B1 connector 1 pin) and TP-E (⏚) . 3. Confirm that the voltage is DC 114.5V $^{+2V}_{-2.5V}$.

ADJUSTMENT OF VIDEO/DEF. CIRCUIT

Item	Measuring instrument	Test point	Adjustment part	Description
IF VCO adjustment	Oscillo-scope Signal generator	CW Connector 3 pin	CW TRANSF. (T131) [RF AFC CHK] MODE	1. Receive the color bar signal. 2. Connect the oscilloscope to pin 3 of the CW connector. 3. Select the [RF AFC CHK] MODE of the SERVICE MENU. Set the RF AFC to OFF and FINE to +00. 4. Turn T131, verify that the AFC output voltage changes quickly between 2.5V ± 1.5V and then adjust the voltage to 2.5V ± 0.2V. 5. Return the RF AFC to ON. 6. Cancel the service menu and check that no irregularities are displayed on the screen.If there any irregularities, select [RF AFC CHK] MODE on the service menu and verify that FINE is 00 when the AFC is ON. Repeat steps 3 to 5 if necessary.
RF.AGC adjustment			No.22 RF AGC	1. Receive a broadcast. 2. Select "No.22 RF AGC" of the PICTURE MODE. 3. Press the MUTE key and turn off color. 4. With the MENU LEET key, get noise in the screen picture.(0 side of setting value) 5. Press the MENU RIGHT key and stop when noise disappears from the screen. 6. Change to other channels and make sure that there is no irregularity. 7. Press the MUTE key and get color out.
FOCUS adjustment	Signal generator		FOCUS VR [built-in HVT]	1. Receive a crosshatch signal. 2. While looking at the screen, adjust FOCUS VR so that the vertical and horizontal lines will be clear and in fine detail. 3. Make sure that the picture is in focus even when the screen gets darkened.

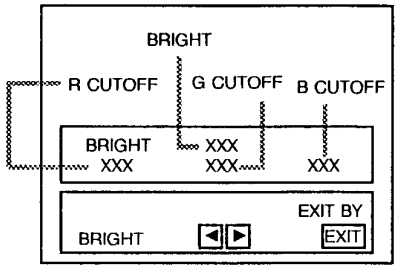


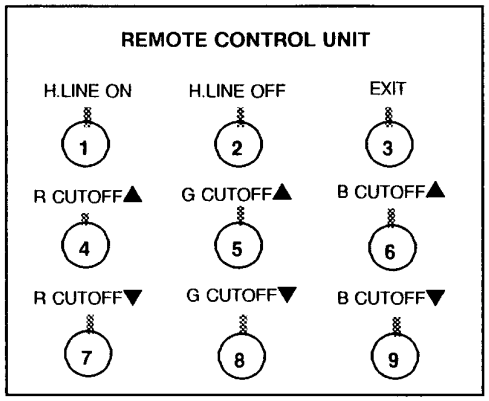
Item	Measuring instrument	Test point	Adjustment part	Description
V.CENTER, V.SIZE Adjustment	**Signal generator**		**No.14 V.SIZE** **No.15 V.CENT**	1. Receive a crosshatch signal. 2. Select "No.14 V.SIZE" and "No.15 V.CENT" in the PICTURE MODE. 3. Set the initial setting value of "No.14 V.SIZE" and "No.15 V.CENT" with the LEFT / RIGHT Key of the MENU. 4. Adjust "No.15 V.CENT"until the screen is centered vertically. 5. Adjust "No.14 V .SIZE"until the vertical screen size is 92%.
H.POSITON Adjustment	**Signal generator**		**No.16 H.POS**	1. Receive a crosshatch signal. 2. Select the "No.16 H.POS" of the PICTURE MODE. 3. Set the initial setting value of the "No.16 H.POS" with the LEFT / RIGHT key of the MENU. 4. Adjust the "No.16 H.POS" until the screen will be horizontally centered.



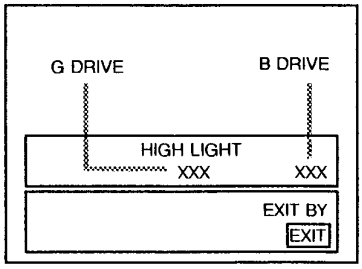
<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment item</th><th>Description</th></tr>
<tr>
<td>WHITE BALANCE (Low Light) adjustment</td>
<td>Signal generator</td>
<td></td>
<td>BRIGHT
R CUTOFF
G CUTOFF
B CUTOFF
SCREEN VR</td>
<td>1. Receive a monoscope pattern signal.
2. Select the [LOW LIGHT] MODE from the SERVICE MENU.
3. Set the initial setting value of "BRIGHT" with the LEFT / RIGHT Key of the Remote control unit.
4. Set the initial setting value of "R CUTOFF", "G CUTOFF" and "B CUTOFF" with the ④ to ⑨ keys of the Remote control unit.
5. Display one horizontal line by pressing the ① key of the Remote control unit.
6. Turn the screen VR all the way to the left.
7. Turn the screen VR gradually to the right from the left until either one of the red, blue or green colors appears slightly.
8. Adjust the two colors which did not appear until the one horizontal line that is displayed becomes white using the ④ to ⑨ keys of the Remote control unit.
9. Turn the screen VR until the first horizontal line is displayed slightly.
10. Press the ② key to return to the regular screen.
* The ③ EXIT key is the cancel key for the WHITE BALANCE.</td>
</tr>
<tr>
<td>WHITE BALANCE (High Light) adjustment</td>
<td>Signal generator</td>
<td></td>
<td>G DRIVE
B DRIVE</td>
<td>1. Receive a monoscope pattern signal.
2. Select the [HIGH LIGHT] MODE in the SERVICE MENU.
3. Set the initial setting value of "G DRIVE" and "B DRIVE" with the ⑤, ⑥, ⑧ and ⑨ keys of the Remote control unit.
4. Adjust the screen unit it becomes white using the ⑤, ⑥, ⑧ and ⑨ keys of the Remote control unit.
* The ③ EXIT key is the cancel key for the WHITE BALANCE.</td>
</tr>
</table>

[LOW LIGHT] MODE





[HIGH LIGHT] MODE



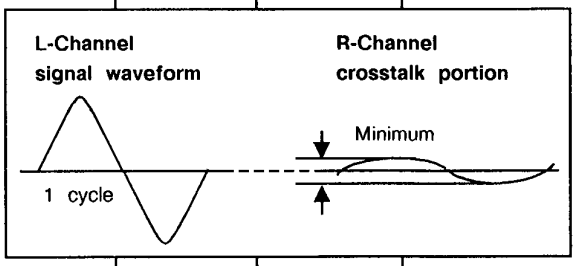
Remote control unit
①key : H.LINE ON
②key : H.LINE OFF
③key : EXIT
⑤key : G DRIVE ▲
⑥key : B DRIVE ▲
⑧key : G DRIVE ▼
⑨key : B DRIVE ▼

Item	Measuring instrument	Test point	Adjustment item	Description
SUB BRIGHT adjustment			No.1 BRIGHT	1. Receive a broadcast. 2. Select "No.1 BRIGHT" of the PICTURE MODE. 3. Set the initial setting value of the "No.1 BRIGHT" with the LEFT / RIGHT key of the MENU. 4. If the brightness is not the best with the initial setting value, make fine adjustment of the "No.1 BRIGHT" until you get the optimum brightness.
SUB CONTRAST adjustment			No.2 PICTURE	1. Receive a broadcast. 2. Select "No.2 PICTURE" of the PICTURE MODE. 3. Set the initial setting value of the "No.2 PICTURE" with the LEFT / RIGHT key of the MENU. 4. If the contrast is not the best with the initial setting value, make fine adjustment of the "No.2 PICTURE" until you get the optimum contrast.
SUB COLOR adjustment			No.7 COLOR	1. Receive a broadcast. 2. Select "No.7 COLOR" of the PICTURE MODE. 3. Set the initial setting value of the "No.7 COLOR" with the LEFT / RIGHT key of the MENU. 4. If the color is not the best with the initial setting value, make fine adjustment of the "No.7 COLOR" until you get the optimum color.
SUB TINT adjustment			No.6 TINT	1. Receive a broadcast. 2. Select "No.6 TINT" of the PICTURE MODE. 3. Set the initial setting value of the "No.6 TINT" with the LEFT / RIGHT key of the MENU. 4. If the tint is not the best with the initial setting value, make fine adjustment of the "No.6 TINT" until you get the optimum tint.

ADJUSTMENT OF MTS CIRCUIT

Item	Measuring instrument	Test point	Adjustment part	Description
MTS INPUT LEVEL check			No.4 IN LEVEL	1. Select the "No.4 IN LEVEL" of the SOUND MODE. 2. Verify that the "No.4 IN LEVEL" is set at its initial setting value.
MTS STEREO VCO adjustment	Signal generator Frequency counter	MPX Connector 2 pin RTV	No.5 FH MON. No.6 ST VCO	1. Receive a RF signal (nonmodulated sound signal) from the antenna terminal. 2. Select the "No.5 FH MON. of SOUND MODE, and change the setting value from 0 to 1. 3. Connect the Frequency Counter to pin 2 of MPX connector. 4. Select the "No.6 ST VCO". 5. Set the initial setting value of the "No.6 ST VCO" with the LEFT/RIGHT key of the menu. 6. Adjust the "No.6 ST VCO" so that the Frequency Counter will display 15.73KHz ± 0.1KHz. 7. Select the "No.5 FH MON." of the SOUND MODE, and reset the setting value from 1 to 0.

Item	Measuring instrument	Test point	Adjustment part	Description
MTS SAP VCO adjustment	**Signal generator** **Frequency counter**	**MPX Connector** **4 pin SDA** **3 pin GND** **2 pin RTV**	**No.11 5FH MON.** **No.12 SAP VCO**	1. Receive a RF signal (nonmodulated sound signal) from the antenna terminal. 2. Connect between pin 4 of MPX connector and GND (Pin 3 of MPX connector) through 1MΩ Resistor. 3. Select the "No.11 5FH MON." of the SOUND MODE, and reset the setting value from 0 to 1. 4. Connect the Frequency Counter to pin 2 (R.OUT) of MPX connector. 5. Select the "No.12 SAP VCO". 6. Set the initial setting value of "No.12 SAP VCO" with the LEFT/RIGHT key of the menu. 7. Adjust the "No.12 SAP VCO" so that the Frequency Counter will display 78.67KHz ± 0.5KHz. 8. Select the "No.11 5FH MON." of the SOUND MODE, and reset the setting value from 1 to 0.
MTS FILTER check			**No.8 FILTER**	1. Select the "No.8 FILTER" of the SOUND MODE. 2. Verify that the "No.8 FILTER" is set at its initial setting value.
MTS SEPARATIO-N adjustment	**TV audio multiplex signal gen-erator** **Oscillo-scope**	**MPX Connector** **1 pin LTV** **2 pin RTV**	**No.9 LOW SEP.** **No.10 HI SEP.**	1. Input a stereo L signal (300Hz) from the TV Audio Multiplex Signal Generator to the antenna terminal. 2. Connect an oscilloscope to pin 1 (L OUT) of MPX connector, and display one cycle portion of the 300Hz signal. 3. Change the connection of the oscilloscope to pin 2 (R OUT) of MPX connector, and enlarge the voltage axis. 4. Select the "No.9 LOW SEP." of the SOUND MODE. 5. Set the initial setting value of the "No.9 LOW SEP." with the LEFT/RIGHT key of the menu. 6. Adjust the "No.9 LOW SEP." so that the stroke element of the 300Hz signal will become minimum. 7. Change the signal to 3kHz, and similarly adjust the "No.10 HI SEP.".



PURITY, CONVERGENCE

PURITY ADJUSTMENT

1. Demagnetize CRT with the demagnetizer.
2. Loosen the retainer screw of the deflection yoke.
3. Remove the wedge.
4. Input a Green Raster signal from the Signal Generator, and turn the screen to Green Raster.
5. Move the deflection yoke backward.
6. Bring the long lug of the purity magnets on the short lug and position them horizontally. (Fig. 3)
7. Adjust the gap between two lugs so that the Green Raster will come into the center of the screen. (Fig. 4)
8. Move the deflection yoke forward, and fix the position of the deflection yoke so that the whole screen will become green.
9. Insert the wedge to the top side of the deflection yoke so that it will not move.
10. Input a crosshatch signal.
11. Verify that the screen is horizontal.
12. Input red and Blue Raster signals, and make sure that purity is properly adjusted.

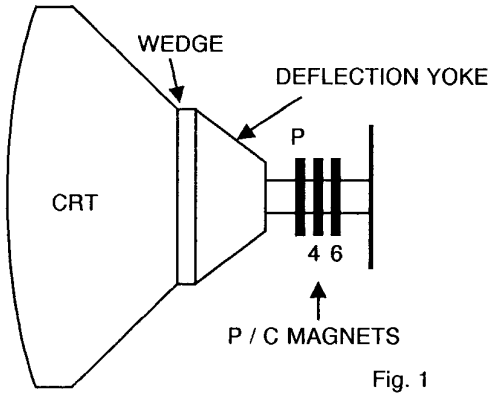


Fig. 1

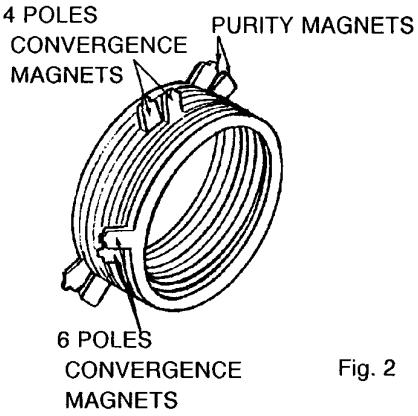
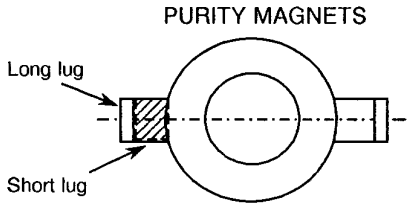


Fig. 2



Bring the long lug over the short lug and position them horizontally.

Fig. 3

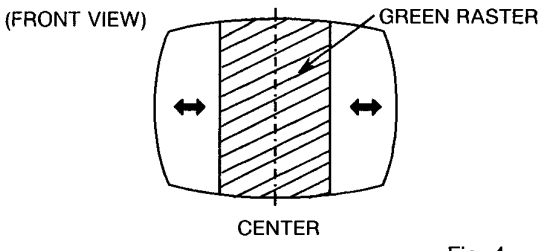


Fig. 4

STATIC CONVERGENCE ADJUSTMENT

1. Input a crosshatch signal.
2. Using 4-pole convergence magnets, overlap the red and blue lines in the center of the screen and turn them to magenta (red/blue).
3. Using 6-pole convergence magnets, overlap the magenta (red/blue) and green lines in the center of the screen and turn them to white.
4. Repeat 2 and 3 above, and make best convergence.

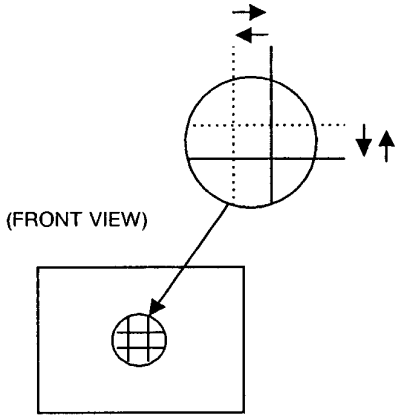


Fig. 1

DYNAMIC CONVERGENCE ADJUSTMENT

1. Move the deflection yoke up and down and overlap the lines in the periphery. (Fig. 2)
2. Move the deflection yoke left to right and overlap the lines in the periphery. (Fig. 3)
3. Repeat 1 and 2 above, and make best convergence.

(FRONT VIEW)

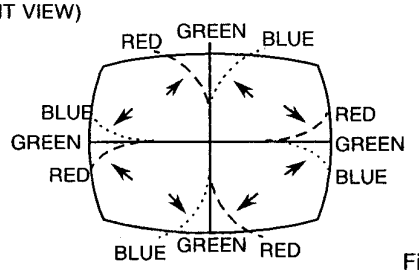


Fig. 2

(FRONT VIEW)

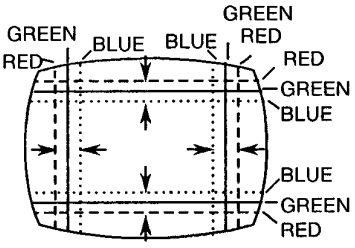


Fig. 3

- After adjustment, fix the wedge at the original position.
  Fasten the retainer screw of the deflection yoke.
  Fix the 6 magnets with glue.

HOW TO CHECK THE HIGH VOLTAGE HOLD DOWN CIRCUIT

1. HIGH VOLTAGE HOLD DOWN CIRCUIT

After repairing the high voltage hold down circuit shown in Fig. 1.
This circuit shall be checked to operate correctly.

2. CHECKING OF THE HIGH VOLTAGE HOLD DOWN CIRCUIT

(1) Turn the POWER SW ON.
(2) As shown in Fig. 1, set the resistor (between [X] connector [1] & [3]).
(3) Make sure that the screen picture disappears.
(4) Temporarily unplug the power cord.
(5) Remove the resistor(between [X] connector [1] & [3]).
(6) Again plug the power cord, make sure that the normal picture is displayed on the screen.

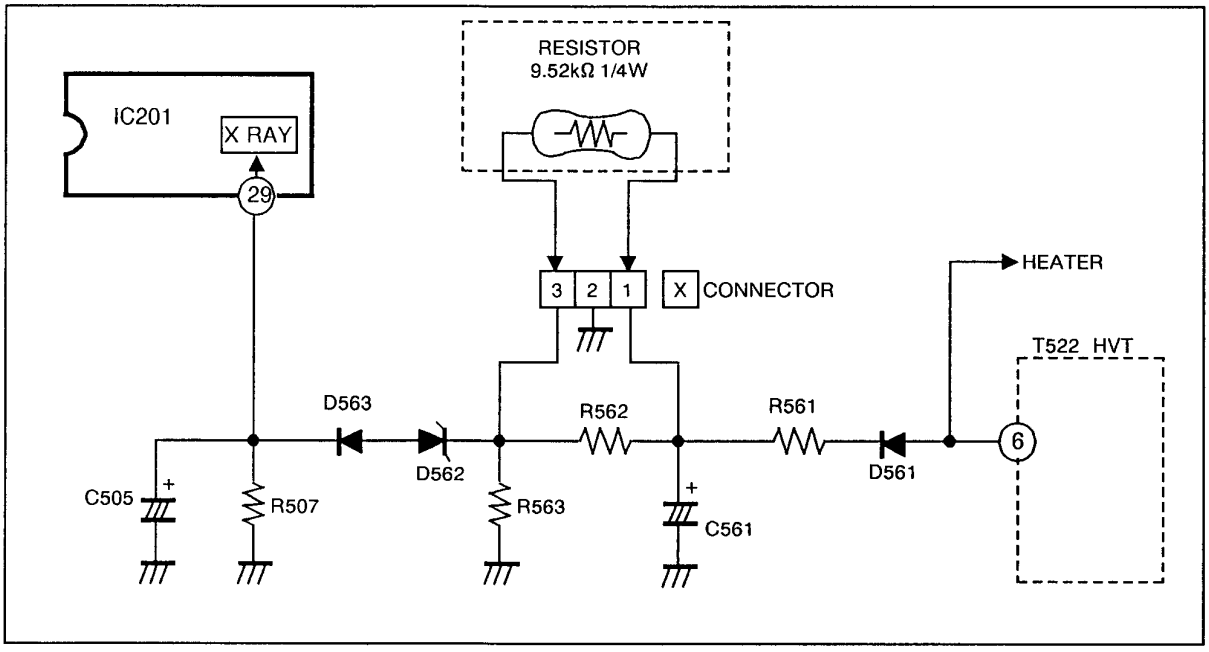


Fig. 1

■ SELF CHECK FUNCTIONS

1. Outline

This model includes a CRT (Cathode Ray Tube) NECK protector function which cuts off the sub-power in the event of a malfunction and informs of the malfunction by flashing ON-TIMER LED.

The malfunction is detected according to the state of the control line input connected to the main CPU.

2. Self check indicating function

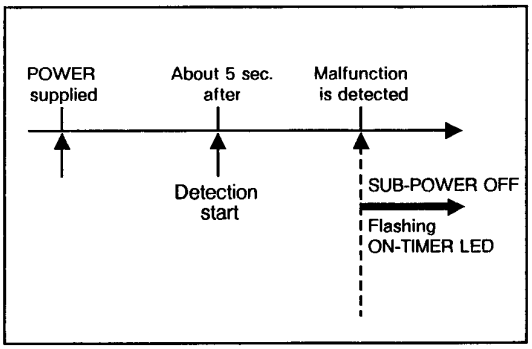
The CRT NECK protector function begins detection about 5 seconds after power is supplied.

In the event a malfunction is detected, the sub-power is cutoff immediately.

At this time, the ON-TIMER LED flashes.

[ON-TIMER LED indication]

1. The ON-TIMER LED flashes at 1 second intervals.



3. Contents of Self check

Check item	Detected contents	Detection method	Abnormality state
CRT NECK protector (Also detected if the power supply line output from the HVT (High voltage Transformer) has shorted with the ground.)	When the vertical circuit S-correction capacitor C427 is shorted, detect the potential drop of the C427, and prevent the burn damage to the CRT NECK. (Grounding of shorting of the power supply output from the HVT to the vertical circuit, and the small signal power supply is also detected.)	The main CPU detects at 30 ms intervals for 16 cycles. If NG is detected 9 or more times out of 16, a malfunction is interpreted.	During an abnormality the sub-power is cutoff. The remote controller power key operation is not recognized and sub-power off is maintained until the power cord is unplugged and reinserted.

REPLACEMENT OF CHIP COMPONENT

■CAUTIONS

1. Avoid heating for more than 3 seconds.
2. Do not rub the electrodes and the resist parts of the pattern.
3. When removing a chip part, melt the solder adequately.
4. Do not reuse a chip part after removing it.

■SOLDERING IRON

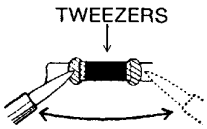
1. Use a high insulation soldering iron with a thin pointed end of it.
2. A 30w soldering iron is recommended for easily removing parts.

■REPLACEMENT STEPS

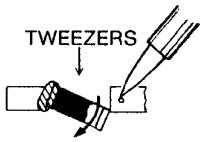
1. How to remove Chip parts

●Resistors, capacitors, etc

(1) As shown in the figure, push the part with tweezers and alternately melt the solder at each end.

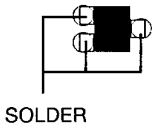


(2) Shift with tweezers and remove the chip part.

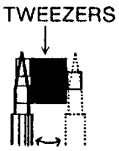


●Transistors, diodes, variable resistors, etc

(1) Apply extra solder to each lead.



(2) As shown in the figure, push the part with tweezers and alternately melt the solder at each lead. Shift and remove the chip part.

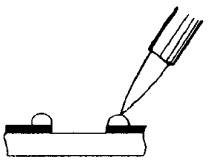


Note: After removing the part, remove remaining solder from the pattern.

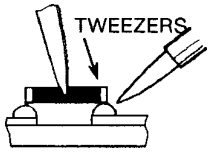
2. How to install Chip parts

●Resistors, capacitors, etc

(1) Apply solder to the pattern as indicated in the figure.



(2) Grasp the chip part with tweezers and place it on the solder. Then heat and melt the solder at both ends of the chip part.

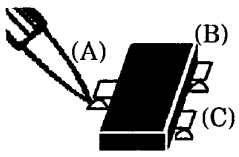


●Transistors, diodes, variable resistors, etc

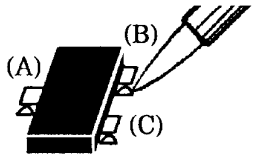
(1) Apply solder to the pattern as indicated in the figure.

(2) Grasp the chip part with tweezers and place it on the solder.

(3) First solder lead A as indicated in the figure.



(4) Then solder leads B and C.



AV-20820(US&CA) STANDARD CIRCUIT DIAGRAM

■NOTE ON USING CIRCUIT DIAGRAMS

1.SAFETY

The components identified by the ⚠ symbol and shading are critical for safety. For continued safety replace safety critical components only with manufactures recommended parts.

2.SPECIFIED VOLTAGE AND WAVEFORM VALUES

The voltage and waveform values have been measured under the following conditions.

(1)Input signal :Color bar signal
(2)Setting positions of each knob/button and variable resistor :Original setting position when shipped
(3)Internal resistance of tester :DC 20kΩ/V
(4)Oscilloscope sweeping time :H ⇒20μS/div
:V ⇒5mS/div
:Others ⇒ Sweeping time is specified
(5)Voltage values :All DC voltage values

* Since the voltage values of signal circuit vary to some extent according to adjustments, use them as reference values.

3.INDICATION OF PARTS SYMBOL[EXAMPLE]

●In the PW board :R1209→R209

4.INDICATIONS ON THE CIRCUIT DIAGRAM

(1)Resistors

●Resistance value
No unit :[Ω]
K :[KΩ]
M :[MΩ]

●Rated allowable power
No indication :1/6[W]
Others :As specified

●Type
No indication :Carbon resistor
OMR :Oxide metal film resistor
MFR :Metal film resistor
MPR :Metal plate resistor
UNFR :Uninflammable resistor
FR :Fusible resistor

* Composition resistor 1/2 [W] is specified as 1/2S or Comp.

(2)Capacitors

●Capacitance value
1or higher :[pF]
less than 1 :[μF]

●Withstand voltage
No indication :DC50[V]
Others :DC withstand voltage[V]
AC indicated :AC withstand voltage[V]

* Electrolytic Capacitors
47/50[Example]:Capacitance value[μF]/withstand voltage[V]

●Type
No indication :Ceramic capacitor
MY :Mylar capacitor
MM :Metalized mylar capacitor
PP :Polypropylene capacitor
MPP :Metalized polypropylene capacitor
MF :Metalized film capacitor
TF :Thin film capacitor
BP :Bipolar electrolytic capacitor
TAN :Tantalum capacitor

(3)Coils

No unit :[μH]
Others :As specified

(4)Power Supply

:B1(114.5V)
:B2(12V)
:9V
:5V

* Respective voltage values are indicated.

(5)Test Point

: Test point
: Only test point display

(6)Connecting method

: Connector
: Wrapping or soldering
: Receptacle

(7)Ground symbol

: LIVE side ground
: ISOLATED(NEUTRAL) side ground
: EARTH ground
: DIGITAL ground

5.NOTE FOR REPAIRING SERVICE

This model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE : (⊥) side GND and the ISOLATED(NEUTRAL) : (⏚) side GND. Therefore, care must be taken for the following points.

(1) Do not touch the LIVE side GND or the LIVE side GND and the ISOLATED(NEUTRAL) side GND simultaneously. If the above caution is not respected, an electric shock may be caused. Therefore, make sure that the power cord is surely removed from the receptacle when, for example, the chassis is pulled out.

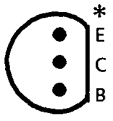
(2) Do not short between the LIVE side GND and ISOLATED(NEUTRAL) side GND or never measure with a measuring apparatus (oscilloscope, etc.) the LIVE side GND and ISOLATED(NEUTRAL) side GND at the same time. If the above precaution is not respected, a fuse or any parts will be broken.

◇ Since the circuit diagram is a standard one, the circuit and circuit constants may be subject to change for improvement without any notice.

Jan. 1997 No.51196

SEMICONDUCTOR SHAPES (* = Bottom view)

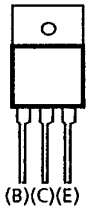
TRANSISTORS



2SA562TM(Y)
2SA673(C)
2SC2655(Y)
2SA933(QR)
2SC1959
2SC1906
2SC2482(C1)
2SC4722(NP)
2SC1815(YG)

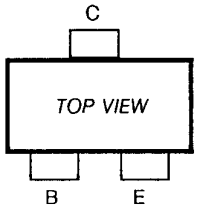
2SC1627A(OY)
2SA966(OY)

2SA933S(QR)
2SC1740S(QR)
2SC2785(JH)

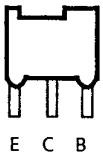


2SD1554-C1
2SD1876-YD
2SD1878-YD

(CHIP TR)

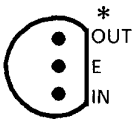


2SA1037K(QR)-X
2SA1162(YG)-X
2SC2712(YG)-X
2SC2412K(QR)-X
DTC124EKA-X
DTA124EKA-X

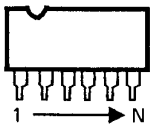


2SC5083(L-P)

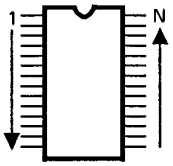
ICs



TA78L005AP
TA78L009AP
TA78L012AP
AN78L05
AN78L09
AN78L12
KIA78L05BP



XRA15128N
BA7612N
BA15218N



CXA1124AS
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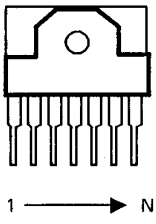
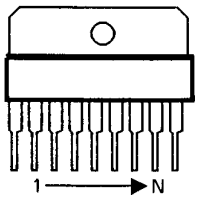
MN1872013JGU3

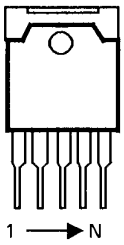
MN1873237JKH6
M37267M8-204SP
TA1242N
TA8601BNV
TA8725AN
TA8725N-J
TA8801AN
UPC1851CU-02



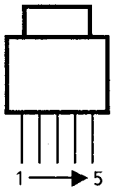
LA7830



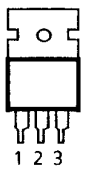
AN5265
LA4485



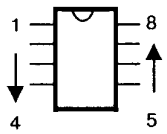
STR-F6514



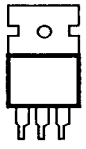
L78LR05E-MA



S1854-C1



ST93C46AB1
AT93C56-10PC
AT24C02-20820



TA78005AP
TA78012AP
AN7805
UPC2412HF
UPC2405HF
KIA7809AI

■ CHANNEL CHART(US)

MODE		BAND	CHANNEL		TUNER BAND
TV	CATV		REAL	DISP.	
○	○	VL	02		I
			03		
			04		
			05		
			06		
		VH	07		II
			08		
			09		
			10		
			11		
			12		
			13		
×	○	MID	A	14	I
			B	15	
			C	16	II
			D	17	
			E	18	
			F	19	
			G	20	
			H	21	
			I	22	
		SUPER	J	23	
			K	24	
			L	25	
			M	26	
			N	27	
			O	28	
			P	29	
			Q	30	
			R	31	
			S	32	
			T	33	
			U	34	
			V	35	
			W	36	
		HYPER	W + 1	37	
			W + 2	38	
			W + 3	39	
			W + 4	40	
			W + 5	41	
			W + 6	42	
			W + 7	43	
			W + 8	44	
			W + 9	45	
			W + 10	46	
			W + 11	47	
			W + 12	48	IV
			W + 13	49	
			W + 14	50	
			W + 15	51	
			W + 16	52	
			W + 17	53	
			W + 18	54	
			W + 19	55	
			W + 20	56	
			W + 21	57	
			W + 22	58	
			W + 23	59	
			W + 24	60	
			W + 25	61	
			W + 26	62	
			W + 27	63	
			W + 28	64	
		ULTRA	W + 29	65	
			W + 30	66	
			W + 31	67	
			W + 32	68	
			W + 33	69	
			W + 34	70	

MODE		BAND	CHANNEL		TUNER BAND
TV	CATV		REAL	DISP.	
×	○	ULTRA	W + 35	71	IV
			W + 36	72	
			W + 37	73	
			W + 38	74	
			W + 39	75	
			W + 40	76	
			W + 41	77	
			W + 42	78	
			W + 43	79	
			W + 44	80	
			W + 45	81	
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			W + 76	117	
			W + 77	118	
			W + 78	119	
			W + 79	120	
			W + 80	121	
			W + 81	122	
			W + 82	123	
			W + 83	124	
			W + 84	125	
		SUB MID	A-8	01	I
			A-4	96	
			A-3	97	
			A-2	98	
			A-1	99	
○	×	UHF	14 ∫ 69		IV

TOTAL 180CH
{ VHF 124CH
{ UHF 56CH

NOTE:
TO RECEIVE THE SUBSCRIPTION OR PREMIUM PROGRAMMING FROM CERTAIN CABLE COMPANIES.
SPECIAL ADAPTERS MAY BE REQUIRED.

CHANNEL CHART(CA)

MODE		BAND	CHANNEL		TUNER BAND
TV	CATV		REAL	DISP.	
○	○	VL	02		I
			03		
			04		
			05		
			06		
		VH	07		II
			08		
			09		
			10		
			11		
			12		
			13		
×	○	MID	A	14	
			B	15	
			C	16	
			D	17	
			E	18	
			F	19	
			G	20	
			H	21	
			I	22	
		SUPER	J	23	
			K	24	
			L	25	
			M	26	
			N	27	
			O	28	
			P	29	III
			Q	30	
			R	31	
			S	32	
			T	33	
			U	34	
			V	35	
			W	36	
		HYPER	W + 1	37	
			W + 2	38	
			W + 3	39	
			W + 4	40	
			W + 5	41	
			W + 6	42	
			W + 7	43	
			W + 8	44	
			W + 9	45	
			W + 10	46	
			W + 11	47	
			W + 12	48	
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			W + 16	52	
			W + 17	53	
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			W + 22	58	
			W + 23	59	
			W + 24	60	
			W + 25	61	
			W + 26	62	
			W + 27	63	
			W + 28	64	
			W + 29	65	
		ULTRA	W + 30	66	IV
			W + 31	67	
			W + 32	68	
			W + 33	69	
			W + 34	70	

MODE		BAND	CHANNEL		TUNER BAND
TV	CATV		REAL	DISP.	
×	○	ULTRA	W + 35	71	IV
			W + 36	72	
			W + 37	73	
			W + 38	74	
			W + 39	75	
			W + 40	76	
			W + 41	77	
			W + 42	78	
			W + 43	79	
			W + 44	80	
			W + 45	81	
			W + 46	82	
			W + 47	83	
			W + 48	84	
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			W + 55	91	
			W + 56	92	
			W + 57	93	
			W + 58	94	
			W + 59	100	
			W + 60	101	
			W + 61	102	
			W + 62	103	
			W + 63	104	
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			W + 65	106	
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			W + 67	108	
			W + 68	109	
			W + 69	110	
			W + 70	111	
			W + 71	112	
			W + 72	113	
			W + 73	114	
			W + 74	115	
			W + 75	116	
			W + 76	117	
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			W + 78	119	
			W + 79	120	
			W + 80	121	
			W + 81	122	
			W + 82	123	
			W + 83	124	
			W + 84	125	
		SUB MID	A-8	01	I
			A-4	96	
			A-3	97	II
			A-2	98	
			A-1	99	
○	×	UHF	14 ~ 69		IV

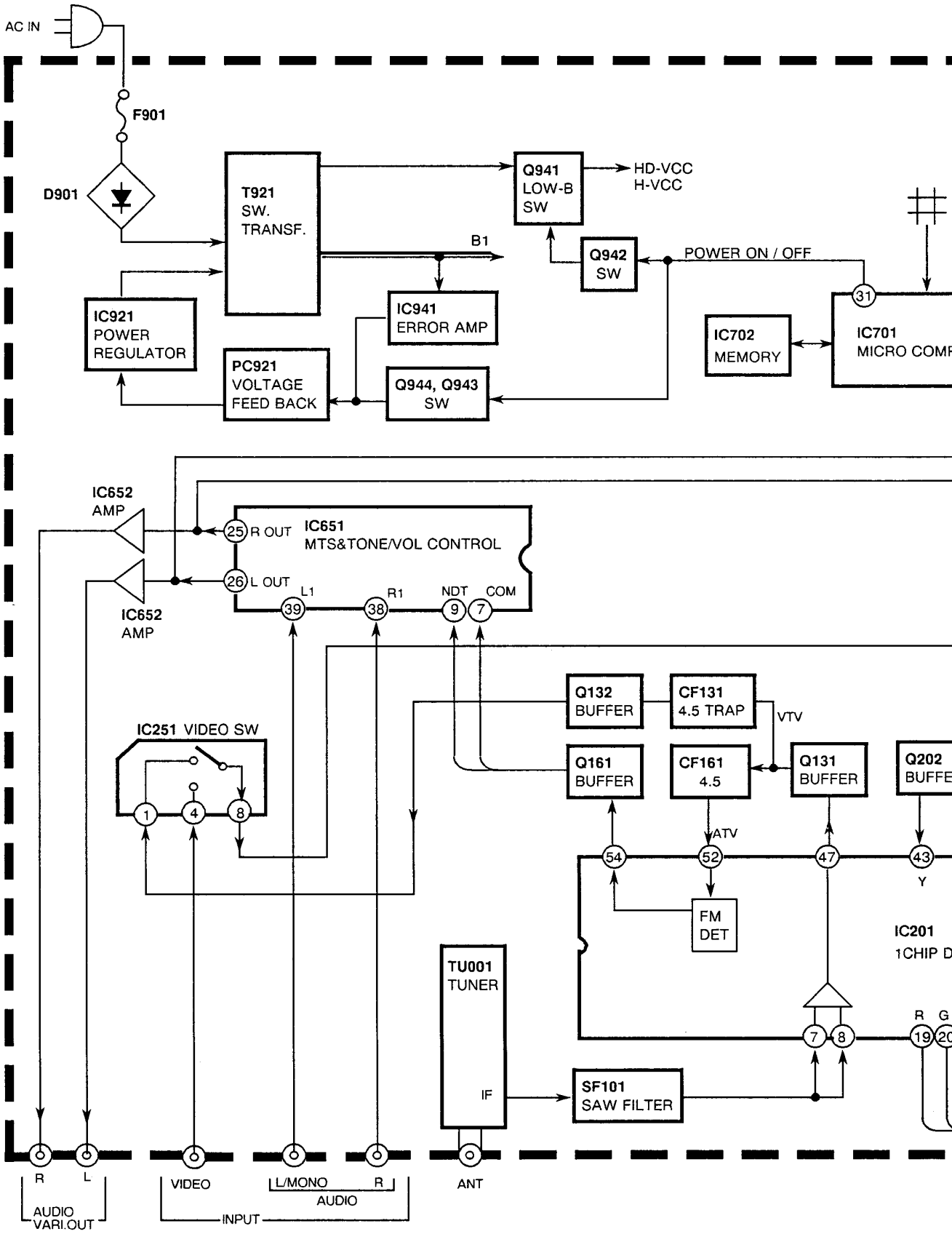
TOTAL 180CH
{ VHF 124CH
{ UHF 56CH

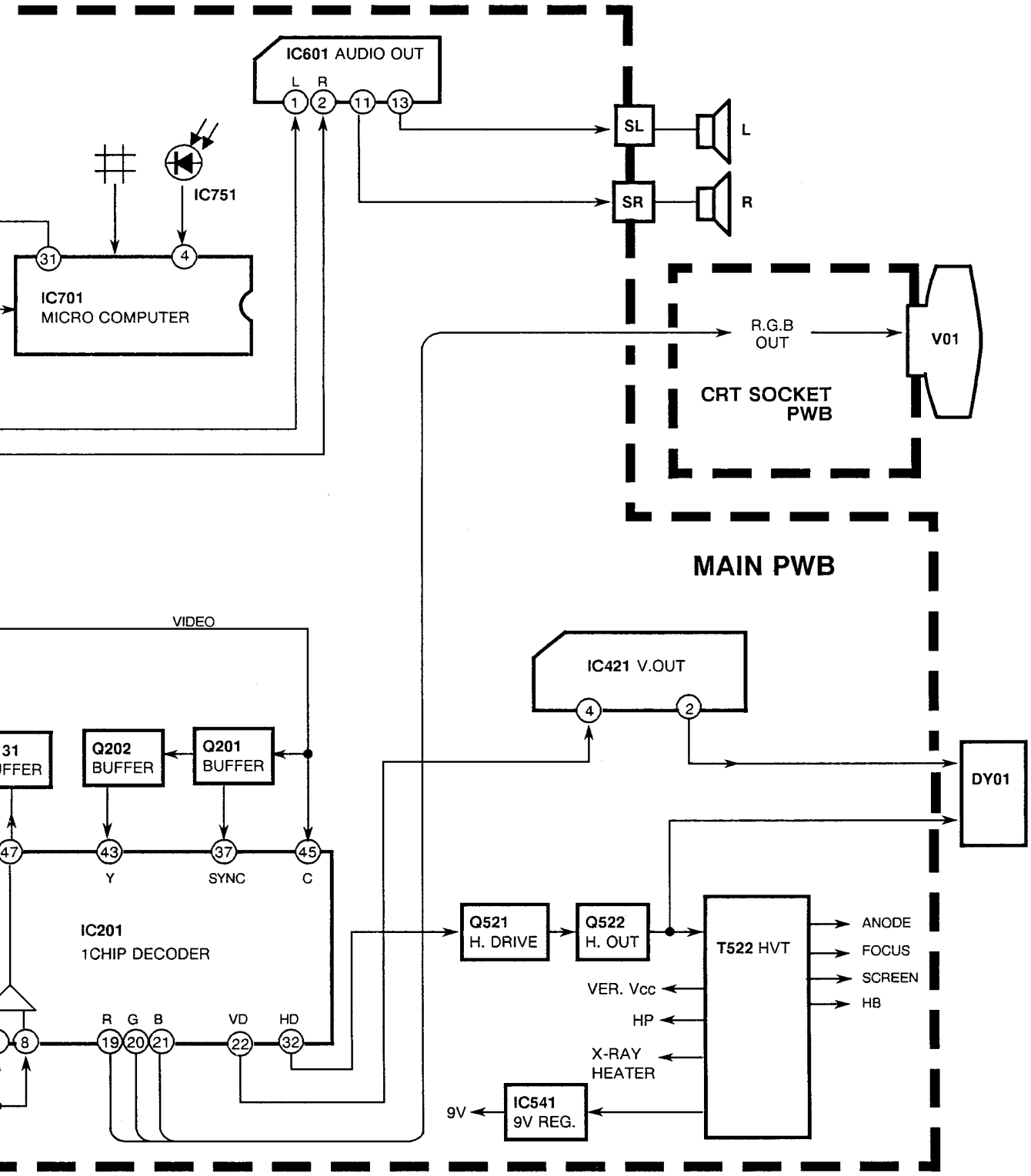
NOTE:
TO RECEIVE THE SUBSCRIPTION OR PREMIUM PROGRAMMING FROM CERTAIN CABLE COMPANIES.
SPECIAL ADAPTERS MAY BE REQUIRED.

WIRING LIST

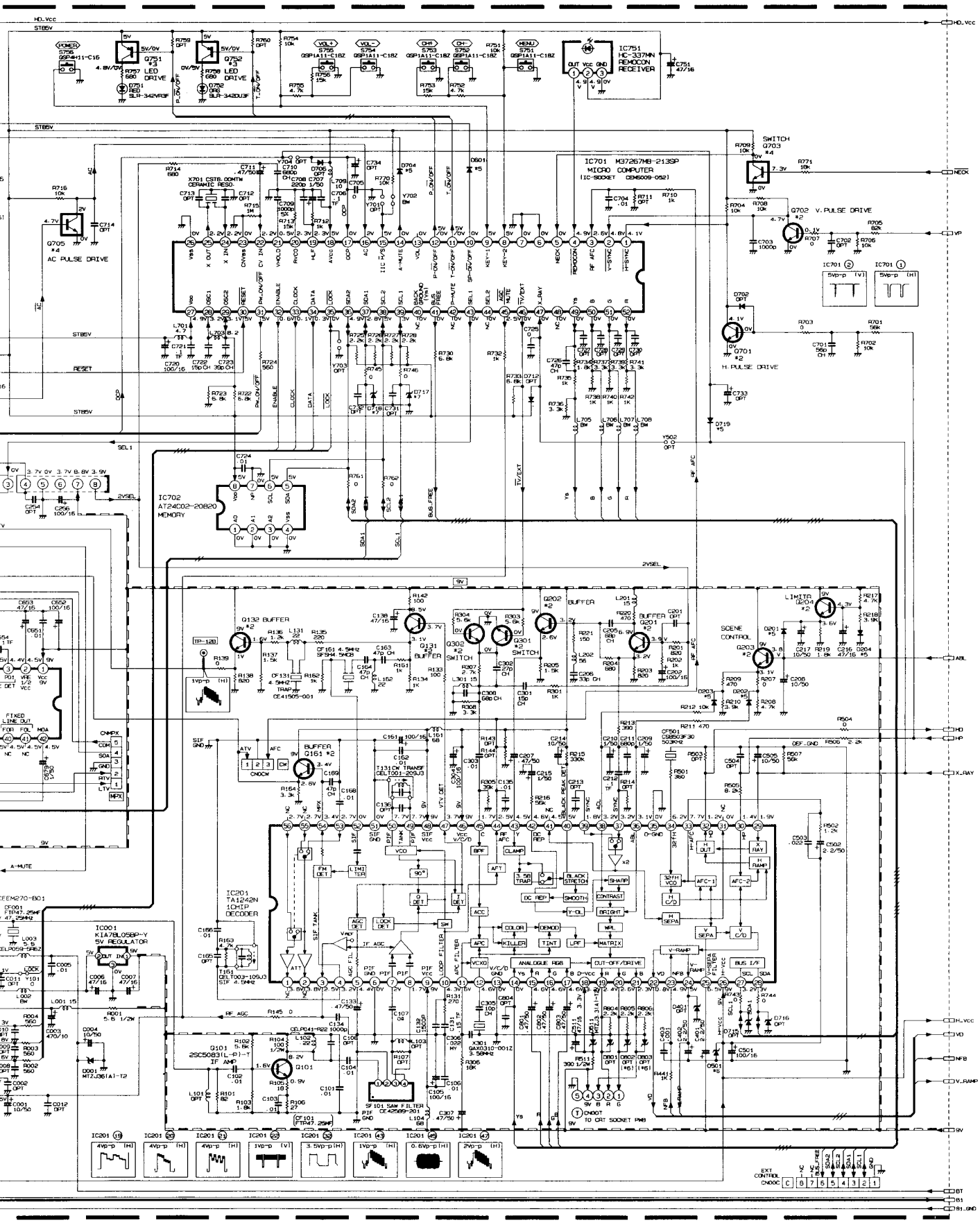
P.W.B or PART NAME	CONNECTOR NAME	WIRING	CONNECTOR NAME	P.W.B or PART NAME
MAIN PWB ASS'Y	T	◄——►	T	CRT SOCKET PWB ASS'Y
MAIN PWB ASS'Y	U	◄——►	U	CRT SOCKET PWB ASS'Y
MAIN PWB ASS'Y	DEG	◄——►	WIRE	DEG. COIL
MAIN PWB ASS'Y	HV	◄——►	WIRE	DEF. YOKE
MAIN PWB ASS'Y	SR	◄——►	WIRE	SPEAKER (R)
MAIN PWB ASS'Y	SL	◄——►	WIRE	SPEAKER (L)
MAIN PWB ASS'Y	PW	◄——►	WIRE	POWER CORD
CRT SOCKET PWB ASS'Y	E1 CRT EARTH	◄——►	EARTH WIRE	CRT (BRAIDED ASS'Y)

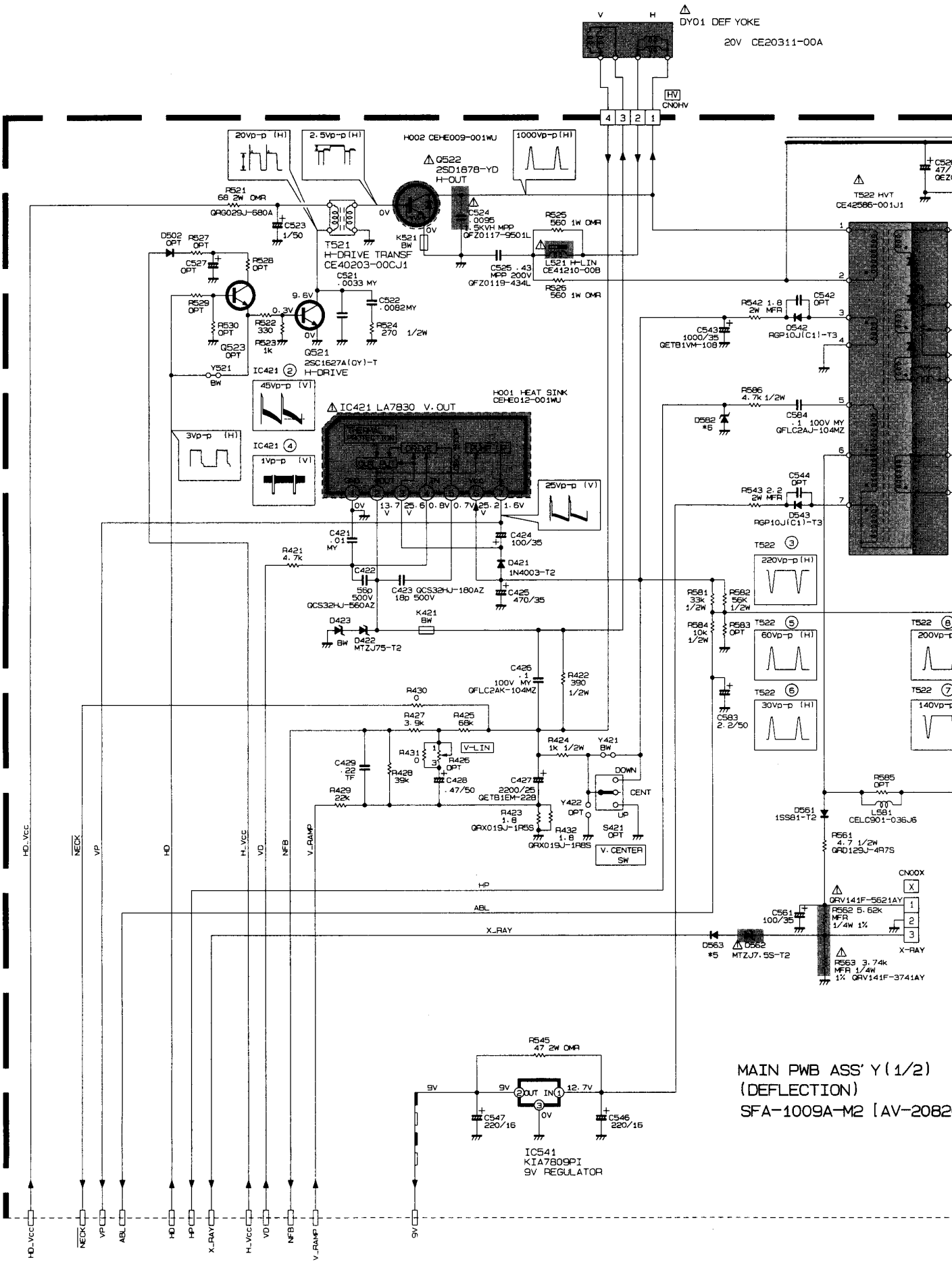
BLOCK DIAGRAM




IC601 AUDIO OUT
L R
1 2 11 13
SL
L
SR
R
IC751
31
4
IC701
MICRO COMPUTER
R.G.B
OUT
V01
CRT SOCKET
PWB
MAIN PWB
VIDEO
IC421 V.OUT
4
2
DY01
Q202
BUFFER
Q201
BUFFER
47
43
37
45
Y
SYNC
C
IC201
1CHIP DECODER
Q521
H. DRIVE
Q522
H. OUT
T522 HVT
ANODE
FOCUS
SCREEN
HB
VER. Vcc
HP
X-RAY
HEATER
R G B
VD
HD
8
19 20 21
22
32
9V
IC541
9V REG.

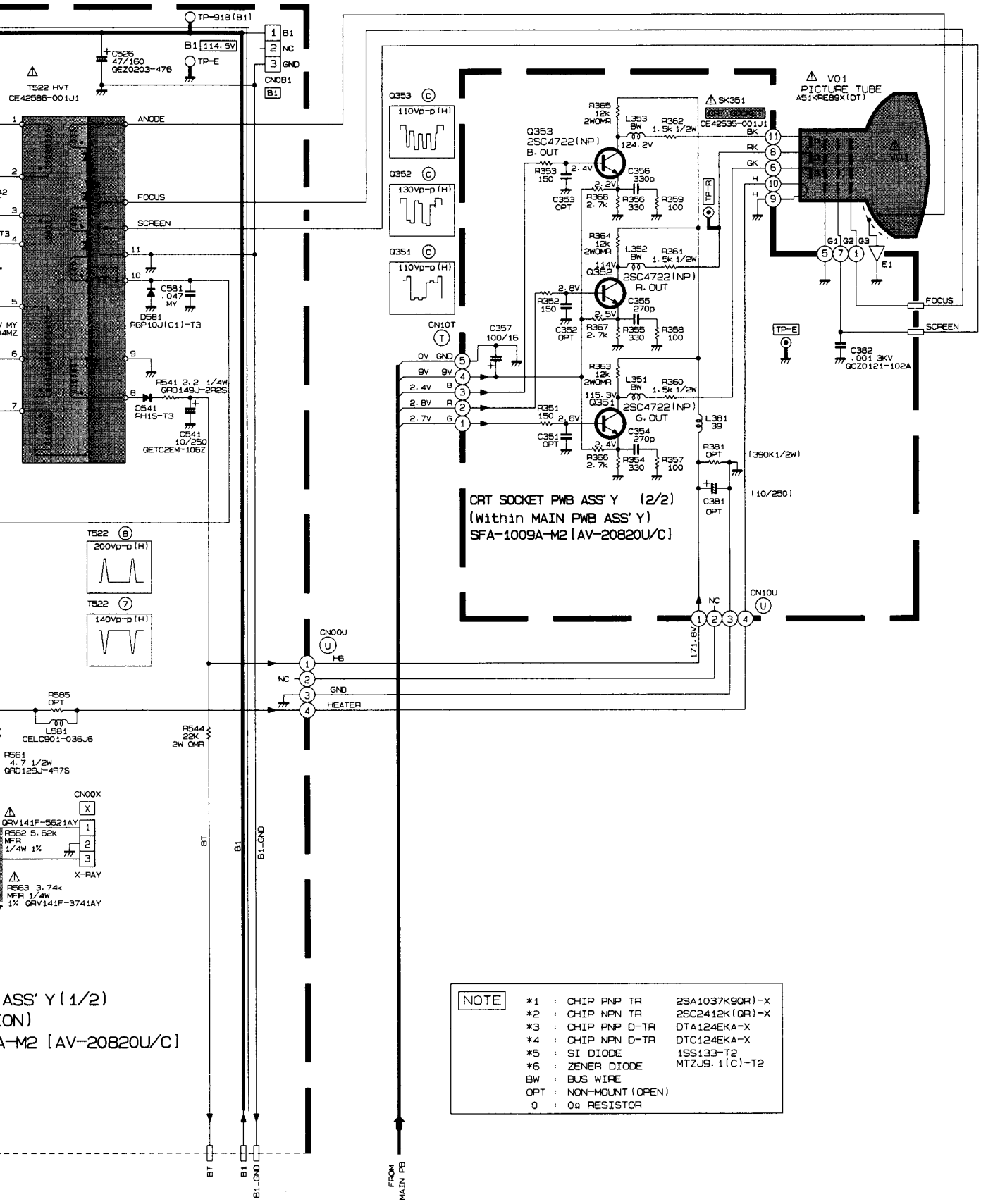
This schematic diagram is applicable to both (US) and (CA) models.





MAIN PWB ASS'Y(1/2)
(DEFLECTION)
SFA-1009A-M2 [AV-2082

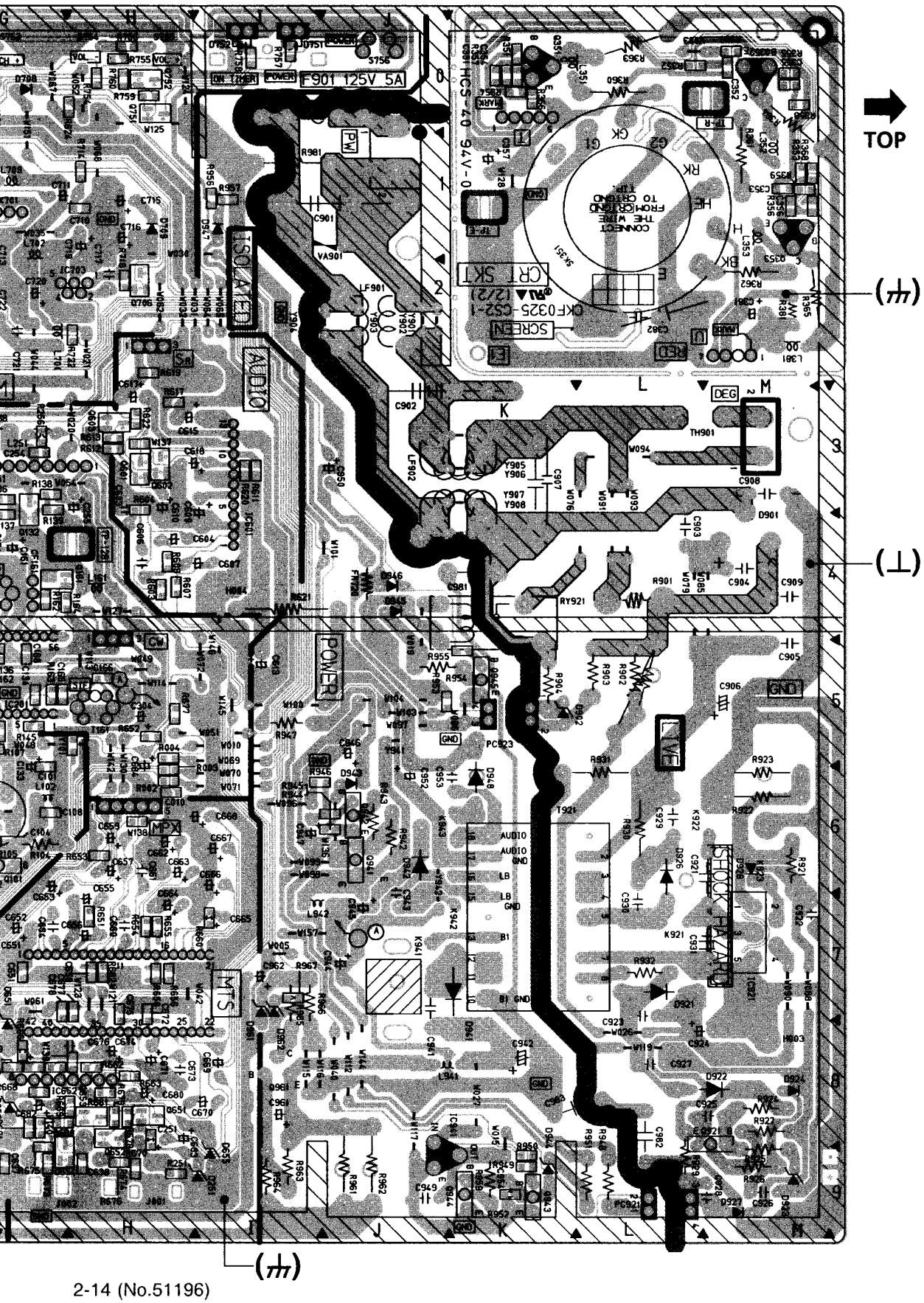
Refer to the following PW Board pattern. : MAIN PWB PATTERN Page 2-13, 2-14, CRT SOCKET PWB PATTERN Page 2-14.


CRT SOCKET PWB ASS'Y (2/2)
(Within MAIN PWB ASS'Y)
SFA-1009A-M2 [AV-20820U/C]
NOTE
*1 : CHIP PNP TR 2SA1037K90R)-X
*2 : CHIP NPN TR 2SC2412K(QR)-X
*3 : CHIP PNP D-TR DTA124EKA-X
*4 : CHIP NPN D-TR DTC124EKA-X
*5 : SI DIODE 1SS133-T2
*6 : ZENER DIODE MTZJ9.1(C)-T2
BW : BUS WIRE
OPT : NON-MOUNT (OPEN)
0 : 0Ω RESISTOR

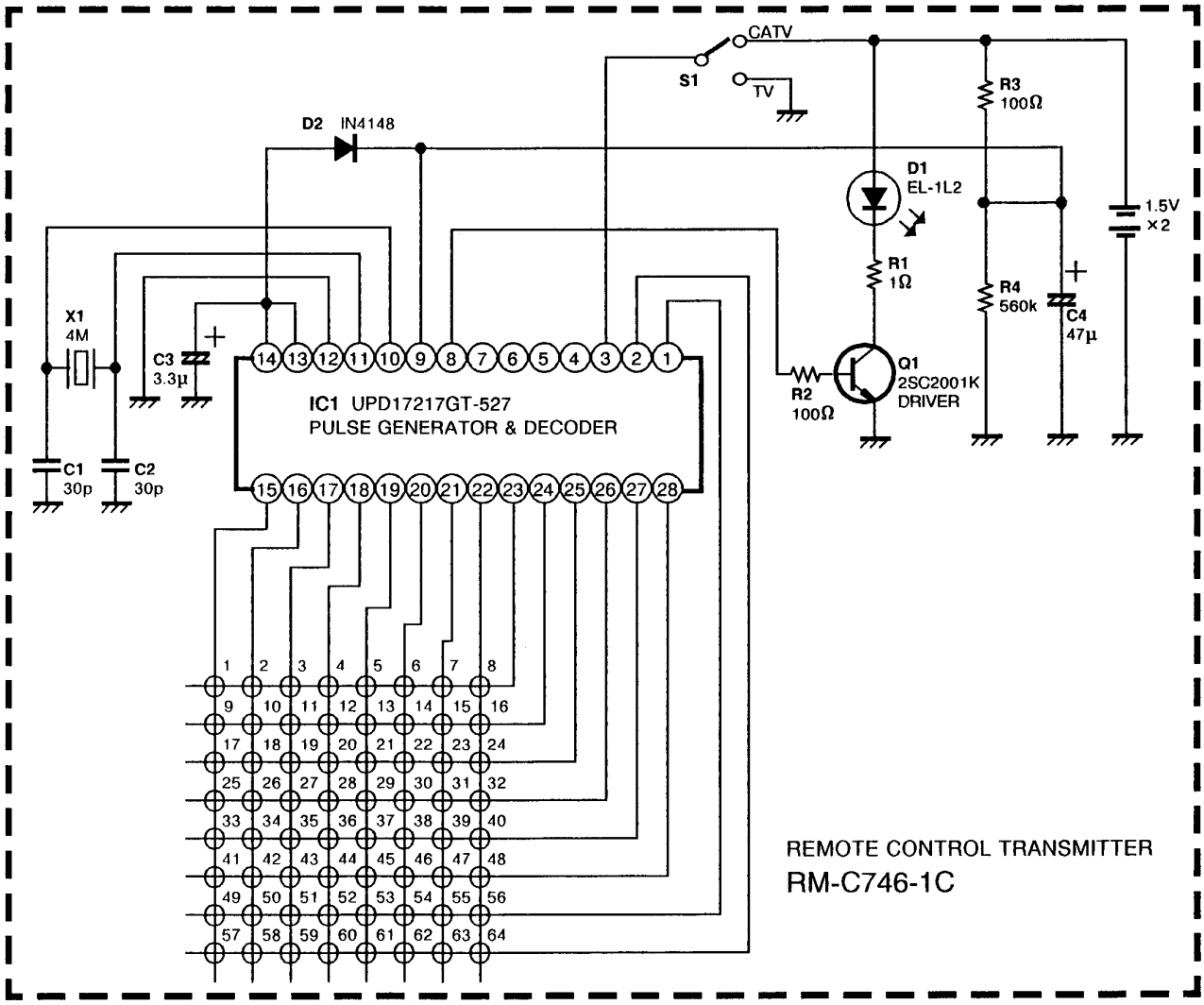
(Magnification Rate 95%)

FRONT

CRT SOCKET PWB ASS'Y(2/2)



REMOTE CONTROL TRANSMITTER CIRCUIT DIAGRAM [RM-C746-1C]



■ KEY FUNCTION

No.	Key name
9	POWER(TV)
10	MENU (▶)
12	8
13	FF ▶▶
14	PAUSE ❙❙
15	9
18	EXIT
21	VCR POWER
22	VOLUME +
23	6
24	3
26	MENU (▲)
28	0

No.	Key name
29	VCR CHANNEL +
30	STOP ■
31	RETURN +
32	2
34	MENU (▼)
36	100 +
37	VCR CHANNEL −
38	CHANNEL +
42	VOLUME −
44	7
45	PLAY ▶
46	CHANNEL −
47	5

No.	Key name
51	DISPLAY
52	TV/VIDEO
53	REC ●
54	MUTE
55	VIDEO STATUS
56	CLOSED CAPTION
58	MENU (◀)
60	SLEEP TIMER
61	REW ◀◀
63	4
64	1

PARTS LIST

CAUTION

- The parts identified by the ⚠ symbol are important for the safety . Whenever replacing these parts, be sure to use specified ones to secure the safety .
- The parts not indicated in this Parts List and those which are filled with lines —— in the Parts No. columns will not be supplied .
- P. W. Board Ass'y will not be supplied, but those which are filled with the Parts No. in the Parts No. columns will be supplied .
- As a rule, the resistors and capacitors which are indicated as shown in "HOW TO EXPRESS PARTS NUMBERS OF STANDARD PARTS" are not shown in the list of the parts on the board .
  When ordering the service parts, confirm the resistance/rated power, capacitance/rated voltage, and type of the parts, then order by the part No. indicated according to "HOW TO EXPRESS PARTS NUMBERS OF STANDARD PARTS" .

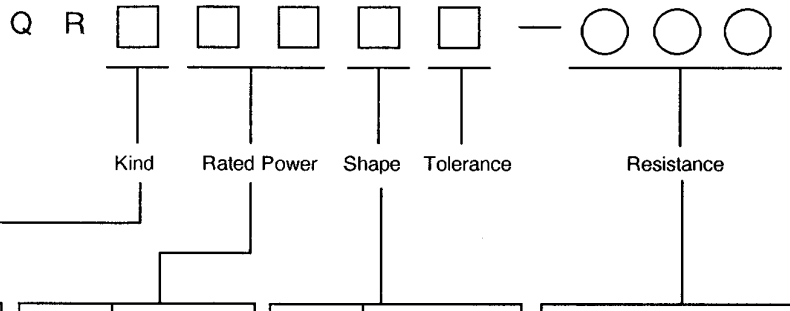
ABBREVIATIONS OF RESISTORS, CAPACITORS AND TOLERANCES

RESISTORS		CAPACITORS	
C R	Carbon Resistor	C CAP.	Ceramic Capacitor
F R	Fusible Resistor	E CAP.	Electrolytic Capacitor
P R	Plate Resistor	M CAP.	Mylar Capacitor
V R	Variable Resistor	HV CAP.	High Voltage Capacitor
HV R	High Voltage Resistor	MF CAP.	Metalized Film Capacitor
MF R	Metal Film Resistor	MM CAP.	Metalized Mylar Capacitor
MG R	Metal Glazed Resistor	MP CAP.	Metalized Polystyrol Capacitor
MP R	Metal Plate Resistor	PP CAP.	Polypropylene Capacitor
OM R	Metal Oxide Film Resistor	PS CAP.	Polystyrol Capacitor
CMF R	Coating Metal Film Resistor	TF CAP.	Thin Film Capacitor
UNF R	Non-Flammable Resistor	MPP CAP.	Metalized Polypropylene Capacitor
CH V R	Chip Variable Resistor	TAN. CAP.	Tantalum Capacitor
CH MG R	Chip Metal Glazed Resistor	CH C CAP.	Chip Ceramic Capacitor
COMP. R	Composition Resistor	BP E CAP.	Bi-Polar Electrolytic Capacitor
LPTC R	Linear Positive Temperature Coefficient Resistor	CH AL E CAP.	Chip Aluminum Electrolytic Capacitor
		CH AL BP CAP.	Chip Aluminum Bi-Polar Capacitor
		CH TAN. E CAP.	Chip Tantalum Electrolytic Capacitor
		CH AL BP E CAP.	Chip Tantalum Bi-Polar Electrolytic Capacitor

TOLERANCES									
F	G	J	K	M	N	R	H	Z	P
±1%	±2%	±5%	±10%	±20%	±30%	+30% - 10%	+50% - 10%	+80% - 20%	+100% - 0%

HOW TO EXPRESS PARTS NUMBERS OF STANDARD PARTS

■ RESISTOR



Symbol	Part Name
C	COMP.R
D	C R
S	CH MG R

Symbol	Rated Power
0 1	1 w
1 2	1/2 w
1 4	1/4 w
1 6	1/6 w
1 8	1/8 w

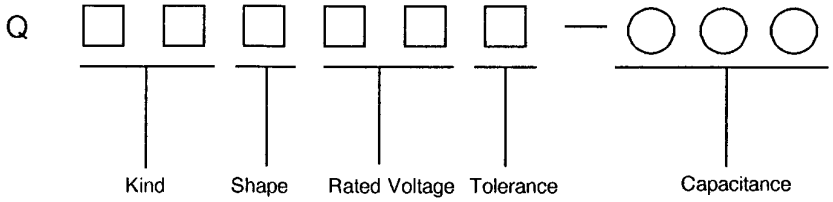
Symbol	Shape
1	Straight lead
8	Chip

Indicate with first two-figure expressed by Ω and following 0.
please note that,in case of resistance less than 10 Ω, a letter "R"will be effective as point.

EX.

2.2 Ω	=		2R2
470 Ω	=	47×10^{1} →	471
150kΩ	=	15×10^{4} →	154

■ CAPACITOR



Symbol	Part Name
CS	C CAP.
CS	CH C CAP.
ET	E CAP.
FM	M CAP.

5Figure / 6Figure	0	1	2
A		10V	100V
C		16V	160V
D			200V
E		25V	250V
H		50V	500V
J	6.3V	63V	
V		35V	

Indicate with first two-figure expressed by pF and following 0.
Please note that,in case of capacitance less than 10 pF a letter "R" will be effective as point.

EX

5pF	=		5R0
1000pF	=	10×10^{2} →	102
47μF	=	47×10^{6} →	476

Symbol	Shape
1	Straight lead
1	Leads in the same direction
8	Chip
A	Leads in the same direction (compact part)

CONTENTS

■ REMOTE CONTROL UNIT PARTS LIST 27

■ EXPLODED VIEW PARTS LIST 28

■ EXPLODED VIEW 29

■ PRINTED WIRING BOARD PARTS LIST
• MAIN PW BOARD ASS'Y (SFA-1009A-M2) 30

■ PACKING 34
■ PACKING PARTS LIST 34

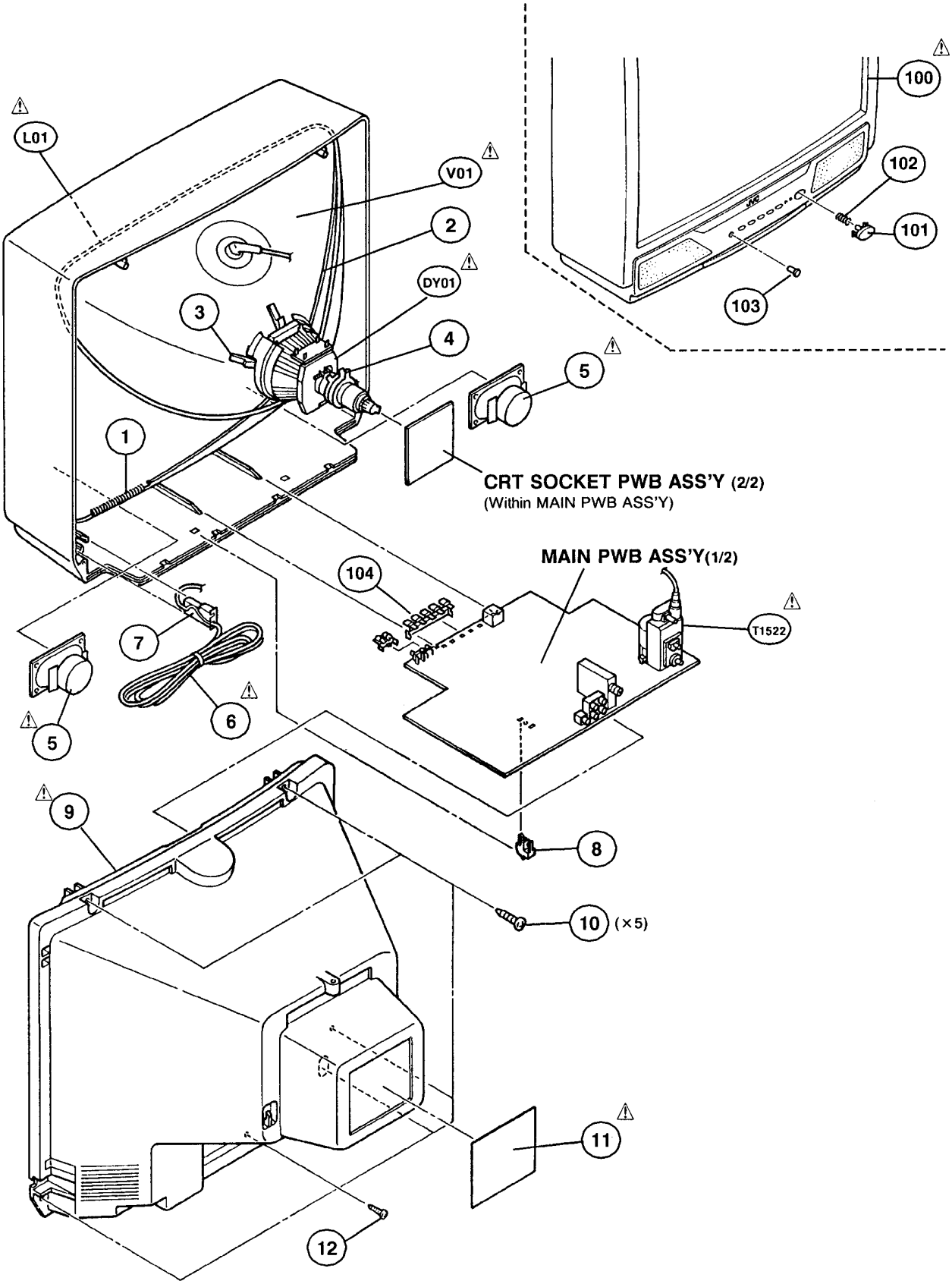
REMOTE CONTROL UNIT PARTS LIST(RM-C746-1C)

⚠ Ref.No.	Part No.	Part Name	Description	Local
	2AA015250	BATTERY COVER		

EXPLODED VIEW PARTS LIST

⚠	Ref.No.	Part No.	Part Name	Description	Local
⚠	DY01	CE20311-00A	DEF YOKE		*
⚠	L01	CELD041-006J3	DEG COIL		*
⚠	T1522	CE42586-001J1	H.V.TRANSF.		
⚠	V01	A51KRE89X(DT)	PICTURE TUBE		*
	1	A48457-4-S	SPRING		*
	2	CHGB0016-0H	BRAIDED ASSY		*
	3	CE42153-00AJ1	WEDGE ASSY	(×4)	*
	4	CE42378-00B	P.C.MAGNET		*
⚠	5	CEBSS09D-03KJ2	SPEAKER	(×2)SP01,SP02	*
⚠	6	QMPD070-200-JC	POWER CORD		*
	7	CM48140-A03-A	POWER CORD CLAMP		*
	8	CM48144-001-A	PB STOPPER		*
⚠	9	CM12741-E02-MA	REAR COVER		*
	10	GBSF4016Z	TAPPING SCREW	(×5)	*
⚠	**11**	**CM22998-001-A**	**RATING LABEL**	**(US)**	
⚠	**11**	**CM22999-001-A**	**RATING LABEL**	**(CA)**	
	12	SBSB3010Z	TAPPING SCREW		*
⚠	100	CM12842-00F-MA	F CABINET ASSY	Inc.No.101～104	*
	101	CM36299-B01-A	POWER KNOB		*
	102	CM36481-001-A	SPRING		*
	103	CM48123-001-A	REMOCON WINDOW		*
	104	CM36300-A01-A	PUSH KNOB		*

EXPLODED VIEW



PRINTED WIRING BOARD PARTS LIST

MAIN PW BOARD ASS'Y (SFA-1009A-M2)

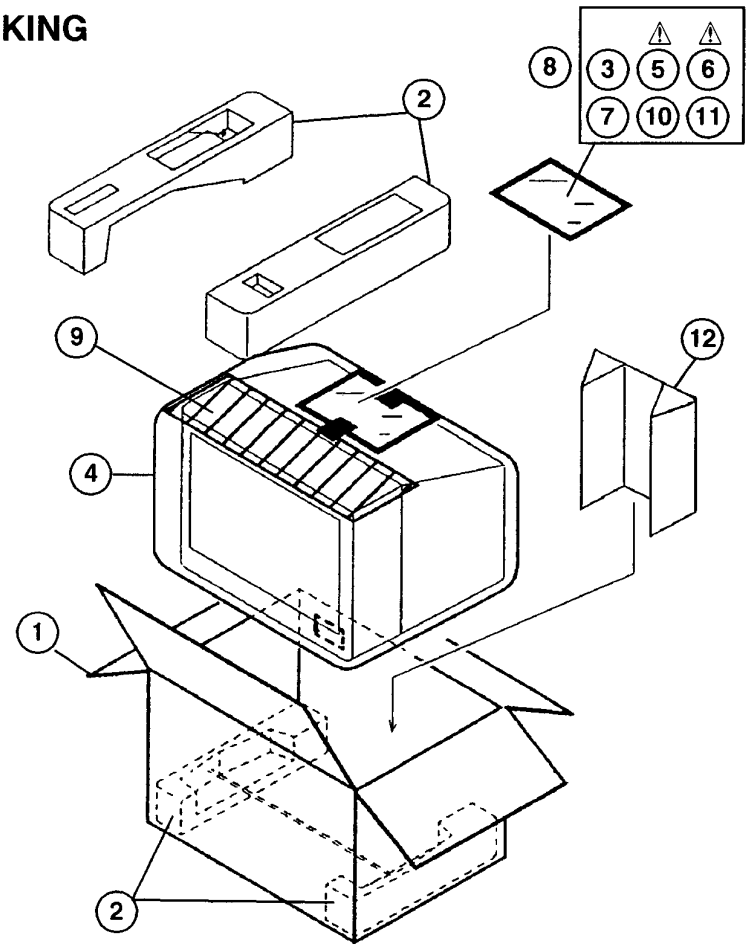
⚠	Symbol No.	Part No.	Part Name	Description			Local
	RESISTOR						
	R1360-62	QRZ0111-152	C R	1.5kΩ	1/2W		*
	R1363-65	QRG029J-123A	OM R	12kΩ	2W	J	*
	R1423	QRX019J-1R5S	MF R	1.5 Ω	1W	J	*
	R1521	QRG029J-680A	OM R	68 Ω	2W	J	*
	R1525-26	QRG019J-561S	OM R	560 Ω	1W	J	*
	R1541	QRD149J-2R2S	C R	2.2 Ω	1/4W	J	*
	R1542	QRX029J-1R8A	MF R	1.8 Ω	2W	J	*
	R1543	QRX029J-2R2A	MF R	2.2 Ω	2W	J	*
	R1544	QRG029J-223A	OM R	22kΩ	2W	J	*
	R1545	QRG029J-470A	OM R	47 Ω	2W	J	*
	R1561	QRD129J-4R7S	C R	4.7 Ω	1/2W	J	*
⚠	R1562	QRV141F-5621AY	MF R	5.62kΩ	1/4W	F	*
⚠	R1563	QRV141F-3741AY	MF R	3.74kΩ	1/4W	F	*
	R1607	QRSA08J-123YL	CHIP MG R	12kΩ	1/10W	J	*
	R1621	QRG039J-100A	OM R	10 Ω	3W	J	*
	R1656	NRVA02D-1501NY	CHIP MF R	1.5kΩ			*
	R1658	NRVA02D-1502NY	MF R	15kΩ			*
⚠	R1901	QRZ0122-R47	UNF R	0.47 Ω	3W		*
	R1922	QRX029J-R33A	MF R	0.33 Ω	2W	J	*
	R1923	QRX029J-R39A	MF R	0.39 Ω	2W	J	*
	R1947	QRD149J-151S	C R	150 Ω	1/4W	J	*
⚠	R1961	QRX029J-R82A	MF R	0.82 Ω	2W	J	*
⚠	R1964	QRD121J-272SY	C R	2.7kΩ	1/2W	J	*
⚠	R1965	QRD121J-473SY	C R	47kΩ	1/2W	J	*
⚠	R1966	QRD121J-223SY	C R	22kΩ	1/2W	J	*
⚠	R1981	QRZ0111-275U	C R	2.7MΩ	1/2W		*
	CAPACITOR						
	C1005	NCB21HK-103AY	CHIP CAP.	0.01μF	50V	K	*
	C1101-04	NCB21HK-103AY	CHIP CAP.	0.01μF	50V	K	*
	C1106	NCB21HK-103AY	CHIP CAP.	0.01μF	50V	K	*
	C1131	QFV71HJ-154MZ	TF CAP.	0.15μF	50V	J	*
	C1132	NCB21HK-152AY	CHIP CAP.	1500pF	50V	K	*
	C1134	NCB21HK-102AY	CHIP CAP.	1000pF	50V	K	*
	C1135	NCB21HK-103AY	CHIP CAP.	0.01μF	50V	K	*
	C1162	NCB21HK-103AY	CHIP CAP.	0.01μF	50V	K	*
	C1163-64	NCT03CH-470AY	CHIP CAP.	47pF	50V	J	*
	C1166	NCB21HK-103AY	CHIP CAP.	0.01μF	50V	K	*
	C1168	NCB21HK-103AY	CHIP CAP.	0.01μF	50V	K	*
	C1205	NCT03CH-680AY	CHIP CAP.	68pF	50V	J	*
	C1206	NCT03CH-330AY	CHIP CAP.	33pF	50V	J	*
	C1211	NCS21HJ-681AY	CHIP C CAP.	680pF	50V	J	*
	C1212	QFV71HJ-104MZ	TF CAP.	0.1μF	50V	J	*
	C1301	NCT03CH-150AY	CHIP CAP.	15pF	50V	J	*
	C1302	NCT03CH-270AY	CHIP CAP.	27pF	50V	J	*
	C1303	NCB21HK-103AY	CHIP CAP.	0.01μF	50V	K	*
	C1305	NCT03CH-100AY	CHIP CAP.	10pF	50V	J	*
	C1306	QFLC1HJ-223MZ	M CAP.	0.022μF	50V	J	*
	C1308	NCT03CH-680AY	CHIP CAP.	68pF	50V	J	*
	C1354-55	NCS21HJ-271AY	CHIP C CAP.	270pF	50V	J	*
	C1356	NCS21HJ-331AY	CER.CAPACITOR-M	330pF	50V	J	*
	C1382	QCZ0121-102A	C CAP.	1000pF	3kV	Z	*
	C1402	QEE61CK-225BZ	TAN.CAP.	2.2μF	16V	K	
	C1403	NCB21HK-102AY	CHIP CAP.	1000pF	50V	K	*
	C1421	QFLC1HJ-103MZ	M CAP.	0.01μF	50V	J	*
	C1424	QETC1VM-107Z	E CAP.	100μF	35V	M	*
	C1425	QETC1VM-477Z	E CAP.	470μF	35V	M	*
	C1426	QFLC2AK-104MZ	M CAP.	0.1μF	100V	K	*
	C1429	QFV71HJ-224MZ	TF CAP.	0.22μF	50V	J	*
	C1503	NCB21HK-223AY	CHIP CAP.	0.022μF	50V	K	*

⚠	Symbol No.	Part No.	Part Name	Description			Local
	C A P A C I T O R						
	C1521	QFN31HJ-332ZJ1	M CAP.	3300 p F	50V	J	*
	C1522	QFN31HJ-822ZJ1	M CAP.	8200 p F	50V	J	*
⚠	C1524	QFZ0117-9501L	MPP CAP.	9500 p F	1.5kVH ± 2.5%		*
	C1525	QFZ0119-434L	MPP CAP.	0.43 µ F	200V		*
	C1526	QEZ0203-476	E CAP.	47 µ F	160V		
	C1541	QETC2EM-106Z	E CAP.	10 µ F	250V	M	*
	C1543	QETB1VM-108	E CAP.	1000 µ F	35V	M	*
	C1561	QETC1VM-107Z	E CAP.	100 µ F	35V	M	*
	C1581	QFLC1HJ-473MZ	M CAP.	0.047 µ F	50V	J	*
	C1584	QFLC2AJ-104MZ	M CAP.	0.1 µ F	100V	J	*
	C1607	QEN61HM-474Z	BP E CAP.	0.47 µ F	50V	M	*
	C1637-38	NCB21HK-472AY	CHIP CAP.	4700 p F	50V	K	*
	C1651	NCB21HK-103AY	CHIP CAP.	0.01 µ F	50V	K	*
	C1654	QFV71HJ-104MZ	TF CAP.	0.1 µ F	50V	J	*
	C1655	QEN61HM-475Z	BP E CAP.	4.7 µ F	50V	M	*
	C1656	QEN61HM-105Z	BP E CAP.	1 µ F	50V	M	*
	C1658	NCB21HK-473AY	CHIP CAP.	0.047 µ F	50V	K	*
	C1660-61	QFV71HJ-104MZ	TF CAP.	0.1 µ F	50V	J	*
	C1662	QEE61CK-335BZ	TAN.CAP.	3.3 µ F	16V	K	
	C1664	QEE61CK-106BZ	TAN.CAP.	10 µ F	16V	K	
	C1669-70	QEN61HM-105Z	BP E CAP.	1 µ F	50V	M	*
	C1672	NCB21HK-222AY	CHIP CAP.	2200 p F	50V	K	*
	C1673	QFV71HJ-104MZ	TF CAP.	0.1 µ F	50V	J	*
	C1675	NCB21HK-222AY	CHIP CAP.	2200 p F	50V	K	*
	C1676	QFV71HJ-104MZ	TF CAP.	0.1 µ F	50V	J	*
	C1701	NCT03CH-560AY	CHIP CAP.	56 p F	50V	J	*
	C1703	NCB21HK-102AY	CHIP CAP.	1000 p F	50V	K	*
	C1704	NCB21HK-103AY	CHIP CAP.	0.01 µ F	50V	K	*
	C1706	QFV71HJ-104MZ	TF CAP.	0.1 µ F	50V	J	*
	C1708	NCS21HJ-221AY	CER.CAPACITOR-M	220 p F	50V	J	*
	C1709	NCS21HJ-102AY	CER.CAPACITOR-M	1000 p F	50V	K	*
	C1710	NCT03CH-681AY	CHIP CAP.	680 p F	50V	J	*
	C1717	QFV71HJ-104MZ	TF CAP.	0.1 µ F	50V	J	*
	C1718	NCB21HK-103AY	CHIP CAP.	0.01 µ F	50V	K	*
	C1721	QFV71HJ-104MZ	TF CAP.	0.1 µ F	50V	J	*
	C1722	NCT03CH-150AY	CHIP CAP.	15 p F	50V	J	*
	C1723	NCT03CH-390AY	CHIP CAP.	39 p F	50V	J	*
	C1724	NCB21HK-103AY	CHIP CAP.	0.01 µ F	50V	K	*
	C1726	NCT03CH-470AY	CHIP CAP.	47 p F	50V	J	*
⚠	C1901	QFZ9040-104N	MF CAP.	0.1 µ F	AC250V		*
⚠	C1902	QFZ9040-104N	MF CAP.	0.1 µ F	AC250V		*
⚠	C1903	QCZ9031-102U	C CAP.	1000 p F	AC125V	M	*
⚠	C1904	QCZ9031-102U	C CAP.	1000 p F	AC125V	M	*
⚠	C1906	QETB2DM-227	E CAP.	220 µ F	200V	M	
⚠	C1907	QFZ9040-473N	MF CAP.	0.047 µ F	AC250V		*
⚠	C1908	QCZ9031-102U	C CAP.	1000 p F	AC125V	M	*
⚠	C1909	QCZ9031-102U	C CAP.	1000 p F	AC125V	M	*
	C1921	QCZ0122-222U	C CAP.	2200 p F	2kV	K	*
	C1922	QFN31HJ-102ZJ1	M CAP.	1000 p F	50V	J	*
	C1924	QETC1VM-107Z	E CAP.	100 µ F	35V	M	*
	C1925	QFN31HJ-102ZJ1	M CAP.	1000 p F	50V	J	*
	C1926	QFN31HJ-392ZJ1	M CAP.	3900 p F	50V	J	*
	C1931	QCZ0122-391U	C CAP.	390 p F	2kV	K	*
	C1941	QCZ0122-561U	C CAP.	560 p F	2kV	K	*
	C1942	QEZ0203-107	E CAP.	100 µ F	160V		*
	C1949	QFV71HJ-104MZ	TF CAP.	0.1 µ F	50V	J	*
⚠	C1981	QCZ9052-102A	C CAP.	1000 p F	AC250V	M	*
⚠	C1982	QCZ9030-103U	C CAP.	0.01 µ F	AC125V	M	*
⚠	C1983	QCZ9030-103U	C CAP.	0.01 µ F	AC125V	M	*
	T R A N S F O R M E R						
	T1131	CELT001-209J3	CW TRANSF.				*
	T1161	CELT003-109J3	SIF TRANSF.				*
	T1521	CE40203-00CJ1	DRIVE TRANSF.				*
⚠	T1522	CE42586-001J1	H.V.TRANSF.				*
⚠	T1921	CETS046-001J8	SW TRANSF.				*

⚠	Symbol No.	Part No.	Part Name	Description	Local
	C O I L				
	L1001	CELP059-150Z	PEAKING COIL	15 μH	*
	L1003	CELP059-5R6Z	PEAKING COIL	5.6 μH	*
	L1102	CELP041-R22	PEAKING COIL	0.22 μH	*
	L1104	CELP059-680Z	PEAKING COIL	68 μH	*
	L1131	CELP059-220Z	PEAKING COIL	22 μH	*
	L1161	CELP059-680Z	PEAKING COIL	68 μH	*
	L1162	CELP059-220Z	PEAKING COIL	22 μH	*
	L1201	CELP059-150Z	PEAKING COIL	15 μH	*
	L1202	CELP059-560Z	PEAKING COIL	56 μH	*
	L1301	CELP059-150Z	PEAKING COIL	15 μH	*
	L1381	CELP059-390Z	PEAKING COIL	39 μH	*
⚠	L1521	CE41210-00B	LINEARITY COIL		*
	L1581	CELC901-036J6	HEATER CHOKE		*
	L1701	CELP059-4R7Z	PEAKING COIL	4.7 μH	*
	L1703	CELP055-8R2Z	PEAKING COIL	8.2 μH	*
	L1709	CELP059-100Z	PEAKING COIL	10 μH	*
	L1941-42	CELC048-820Z	CHOKE COIL		*
	D I O D E				
	D1001	MTZJ36(A)-T2	ZENER DIODE		*
	D1201-04	1SS133-T2	SI.DIODE		*
	D1251	MTZJ9.1(C)-T2	ZENER DIODE		*
	D1421	1N4003-T2	SI.DIODE		*
	D1422	MTZJ75-T2	ZENER DIODE		*
	D1501	MTZJ9.1(C)-T2	ZENER DIODE		*
	D1511	MTZJ3.3(A)-T2	ZENER DIODE		*
	D1541	RH1S-T3	SI.DIODE		*
	D1542-43	RGP10J(C1)-T3	SI.DIODE		*
	D1561	1SS81-T2	SI.DIODE		*
⚠	D1562	MTZJ7.5S-T2	ZENER DIODE		*
	D1563	1SS133-T2	SI.DIODE		*
	D1581	RGP10J(C1)-T3	SI.DIODE		*
	D1582	MTZJ9.1(C)-T2	ZENER DIODE		*
	D1651-52	MTZJ9.1(C)-T2	ZENER DIODE		*
	D1704	1SS133-T2	SI.DIODE		*
	D1717-18	MTZJ5.6(A)-T2	ZENER DIODE		*
	D1719	1SS133-T2	SI.DIODE		*
	D1751	SLR-342VR3F	L.E.D.		*
	D1752	SLR-342DU3F	L.E.D.(ORG)		*
⚠	D1901	D2SBA60	BRIDGE DIODE		*
	D1902	MTZJ15(A)-T2	ZENER DIODE		*
	D1921-22	RGP10J(C1)-T3	SI.DIODE		*
	D1923	MTZJ15(A)-T2	ZENER DIODE		*
	D1924	1SS133-T2	SI.DIODE		*
	D1941	RU3AM-LFC4	SI.DIODE		*
	D1942	RGP10J(C1)-T3	SI.DIODE		*
	D1943	1SS133-T2	SI.DIODE		*
	D1944	MTZJ10(A)-T2	ZENER DIODE		*
	D1945-46	1SS133-T2	SI.DIODE		*
	D1948	RGP10J(C1)-T3	SI.DIODE		*
⚠	D1961	MTZJ7.5S-T2	ZENER DIODE		*
	D1962	MTZJ9.1(C)-T2	ZENER DIODE		*
	T R A N S I S T O R				
	Q1101	2SC5083(L-P)-T	SI.TRANSISTOR		*
	Q1131-32	2SC2412K(QR)-X	SI.TRANSISTOR		*
	Q1161	2SC2412K(QR)-X	SI.TRANSISTOR		*
	Q1201-04	2SC2412K(QR)-X	SI.TRANSISTOR		*
	Q1301-02	2SC2412K(QR)-X	SI.TRANSISTOR		*
	Q1351-53	2SC4722(NP)	SI.TRANSISTOR		*
	Q1521	2SC1627A(OY)-T	SI.TRANSISTOR		*
⚠	Q1522	2SD1878-YD	SI.TRANSISTOR	H.OUT	*
	Q1601	2SC2412K(QR)-X	SI.TRANSISTOR		*
	Q1602-03	DTC124EKA-X	DIGI.TRANSISTOR		*
	Q1651-54	2SC2412K(QR)-X	SI.TRANSISTOR		*

⚠	Symbol No.	Part No.	Part Name	Description	Local
	TRANSISTOR				
	Q1701-02	2SC2412K(QR)-X	SI.TRANSISTOR		*
	Q1703	DTC124EKA-X	DIGI.TRANSISTOR		*
	Q1705	DTC124EKA-X	DIGI.TRANSISTOR		*
	Q1751-52	DTA124EKA-X	DIGI.TRANSISTOR		*
	Q1921	2SA933AS(QR)-T	SI.TRANSISTOR		*
	Q1941	2SA966(OY)-T	SI.TRANSISTOR		*
	Q1942-45	2SC1740S(QR)-T	SI.TRANSISTOR		*
⚠	Q1961	2SA949(Y)C1-T	SI.TRANSISTOR		*
	I C				
	IC1001	KIA78L05BP-Y	I.C.(MONO-ANA)		*
	IC1201	TA1242N	I C		
	IC1251	BA7612N	I.C.(MONO-ANA)		*
⚠	IC1421	LA7830	I.C.(MONO-ANA)		*
	IC1541	KIA7809PI	I.C.(MONO-ANA)		*
⚠	IC1601	LA4485	I.C.(MONO-ANA)		*
	IC1651	UPC1851ACU	I.C.		
	IC1652	BA15218N	I.C.(MONO-ANA)		*
	IC1701	M37267M8-213SP	I.C.(MICRO-COMP)		
	IC1702	AT24C02-20820	I.C.(EP-ROM)	(SERVICE)	
	IC1703	L78LR05E-MA	I.C.(MONO-ANA)		*
	IC1751	HC-337MN	IR DETECT UNIT		*
⚠	IC1921	STR-F6514	I.C.		
⚠	IC1941	S1854-C2	I.C.(MONO-ANA)		
	OTHERS				
		CM45963-004-H	SHIELD PLATE		*
		CM36457-001-A	LED HOLDER		*
	CF1001	FTP47.25MF	CERAMIC FILTER		*
	CF1131	CE41505-001	CERAMIC FILTER		*
	CF1161	SFSH4.5MCB	CERAMIC FILTER		*
	CF1501	CSB503F30-T2	CER.RESONATOR		*
⚠	F1901	QMF0007-5R0J1	FUSE	5.0A	*
⚠	FR1720	QRZ0054-820M	F R	82 Ω 1/4W J	*
	J1001	CEMN065-001	PIN JACK		*
	J1002	CEMN094-001	PIN JACK		
	K1921	QQR0621-001Z	BEADS CORE		*
	K1941-43	QQR0582-001Z	BEADS CORE		*
⚠	LF1901	CE42335-001J1	LINE FILTER		*
⚠	LF1902	CELF011-001J6	LINE FILTER		*
⚠	PC1921	TLP621(B)	I.C.(PH.COUPLER)		*
⚠	PC1923	TLP621(B)	I.C.(PH.COUPLER)		*
⚠	RY1921	CESK028-001	RELAY		*
	S1751	QSP1A11-C18Z	PUSH SWITCH	MENU	*
	S1752	QSP1A11-C18Z	PUSH SWITCH	CH-	*
	S1753	QSP1A11-C18Z	PUSH SWITCH	CH+	*
	S1754	QSP1A11-C18Z	PUSH SWITCH	VOL-	*
	S1755	QSP1A11-C18Z	PUSH SWITCH	VOL+	*
	S1756	QSP4H11-C16	PUSH SWITCH	POWER	
	SF1101	CE42589-201	SAW FILTER		
⚠	SK1351	CE42535-001J1	CRT SOCKET		*
⚠	TH1901	CEKP007-001	P.THERMISTOR		*
⚠	TU1001	CEEM270-B01	TUNER		*
⚠	VA1901	ERZV10V361CS	ZINC N RESISTOR		*
	X1301	CE40668-001Z	CRYSTAL		*
	X1701	CST8.00MTW	CER.RESONATOR		*

PACKING



PACKING PARTS LIST

⚠	Ref.No.	Part No.	Part Name	Description	Local
[America model]					
	1	CP11499-011-A	PACKING CASE		*
	2	CP11553-00B-A	CUSHION ASSY	4pcs in 1set	*
	3	RM-C746-1C	REMOCON UNIT		*
	4	CP30056-009-A	POLY BAG		*
⚠	5	CQ40356-001-A	INST BOOK	(ENGLISH)	*
	7	BT-51006-1Q	REGI.CARD		*
	8	QPGA025-03505A	POLY BAG		*
	9	CP30055-001-A	TOP COVER		*
	12	CP30994-001-A	SUPPORT PARTS		*
[Canada model]					
	1	CP11499-011-A	PACKING CASE		*
	2	CP11553-00B-A	CUSHION ASSY	4pcs in 1set	*
	3	RM-C746-1C	REMOCON UNIT		*
	4	CP30056-009-A	POLY BAG		*
⚠	5	CQ40356-001-A	INST BOOK	(ENGLISH)	*
⚠	6	CQ40357-001-A	INST BOOK	(FRENCH)	*
	8	QPGA025-03505A	POLY BAG		*
	9	CP30055-001-A	TOP COVER		*
	10	BT-20071B-Q	SVC CENTER LIST		*
	11	BT-52002-1Q	WARRANTY CARD		*
	12	CP30994-001-A	SUPPORT PARTS		*

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